THE INSECTS
AND ARACHNIDS
OF CANADA

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PART 20

The Genera and Subgenera of the Sawflies of Canada and Alaska

Hymenoptera: Symphyta

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Ottawa, Ontario

Research Branch
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Introduction

Sawflies are exciting first captures of spring. As soon as most of the snow is gone, many sawflies fly over a tan and gray landscape, to be caught by enthusiastic hymenopterists.

Sawflies as larvae are generally significant defoliators of important agricultural crops and trees (see section entitled "Economic importance"). In Canada we are endowed with a rich sawfly fauna. At present 705 species are recorded in this country, and an additional 150 species that occur in the northern United States are expected to be found eventually in Canada. An unknown but no doubt large number of undescribed species also await discovery. The known Canadian species are divided into 121 genera.

Sawflies are members of the suborder Symphyta, and adults are easily distinguished from those of all other Hymenoptera by the broad joint between the abdomen and the thorax and by the first tergum clearly associated with the abdomen rather than with the metathorax. Sawflies are divided into 14 families, 12 of which are recorded in Canada. Of these families Tenthredinidae is the largest in number of species (565) and genera (89).

Sawflies are found in all regions of Canada. Adults have been recorded from sea level to snow fields in high mountains and from the cool rain forests of the Pacific Coast to the dryest and hottest areas of the country. Sawflies are most diverse in temperate regions but are more numerous in regions with cool summers, near oceans, or in boreal forests (see Price 1975 for life zones mentioned here).

Illustrated keys to adults are included in this book, to ensure accurate and easy identification. I have written the tenthredinid keys to present new and easily interpreted characters, and I have illustrated the keys profusely, to avoid confusion that may be caused by the relative nature of some characters. Whenever possible I have simplified descriptive terms by using English equivalents for traditional Latin or Greek terms. Following the keys, under each taxon I have given a concise characterization when possible, discussed briefly the known and potential diversity in Canada, commented on present geographical distribution and on regions of greatest diversity, recorded notes on habitat, host (or both), and provided pertinent references on keys to species and on biology.

Biological notes

The following is a summary of the introduction to the natural history of sawflies by Benson (1950).

Sawflies are holometabolous insects that go through four development stages: egg, larva, pupa, and adult.

Eggs are generally oval, kidney-, or sausage-shaped. Eggs of Xiphydriidae and Orussidae are borne at the extremity of a long curved stalk as in Cynipoidea and Chalcidoidea. Females lay eggs generally on or below the leaf or stem surface. In most species, females insert their eggs in the plant tissue using their saw-like ovipositor. Egg development is typically rapid (3–47 days), except for those requiring a diapause (i.e., obligatory winter rest) period.

In Canada larvae are found singly or in groups from late May until September. The body coloration of larvae of most species closely matches the background on which they live. Feeding patterns betray the presence of the best camouflaged larvae. Most larvae feed externally on leaves, producing a chewing pattern that is usually not identifiable. However, larval feeding patterns of some species are characteristic: leaf folds (*Phyllocolpa*), leaf and bud galls (*Pontania*), petiole and twig galls (*Euura*), and leaf-mining blisters (Heterarthrinae and *Pseudodineura*). Larvae of some species may leave no visible damage as they feed inside logs (Siricidae and Xiphydriidae), grass stems (Cephidae), catkins (*Amauronematus*), or fruit (*Hoplocampa*). Larvae of still other species hide in silky webs (Pamphiliidae). Depending on the species, larvae may go through four to eight molts, and females in some species may require one more molt than males. Larval development may take as little as 8–30 days for most species or as long as 1–3 years in Siricidae and Xiphydriidae. At the end of the larval development, the larva spins a cocoon that is either on the host plant or in the ground. Generally, in temperate and boreal regions sawflies overwinter as prepupae that resemble larvae but are short and inactive inside a cocoon. For most Canadian species, only one generation per year occurs.

For most species, prepupae molt into pupae in the spring. Adults soon emerge from the cocoon, and shortly after they start looking for mates and food plants. Though the life span of adults is short (usually 3–10 days), adults of most species can be collected over 3–4 weeks and in a few Canadian species, over several months. Reproduction may be bisexual or parthenogenetic. Parthenogenetic reproduction is seen in few species throughout the sawflies. Adults of most species feed on pollen and nectar, but in some species they are predatory (*Tenthredo*) on a wide variety of insects.

Collecting methods

Collecting adult sawflies is affected by the collector's knowledge of habitat and behavior of sawflies, and by sampling techniques used.

Sawflies generally hide during periods of lower relative humidity. Collectors should seek humid habitats, such as marshes and open forests, in regions with cool conditions (boreal or maritime regions) or in cool periods of the day or year. Generally, sawflies fly actively in the spring as long as the temperature remains below 27°C.

Open but wind-protected areas with diverse native and mostly undisturbed vegetation are most productive for general collecting.

If the goal is to get the maximum diversity of sawflies, it is important to sample intensively and efficiently all habitats possible over the season, using active or passive collecting methods.

The main active collecting technique is sweeping the vegetation with a net (Martin 1977). It is an efficient method, but most of the precious collecting time is spent aspirating insects from the net. A solution to this problem is the use of an insect-separating apparatus. Briefly, this apparatus consists of two boxes, one large (20 × 20 × 30 cm) and the other small (20 × 20 × 10 cm), joined together with a common small (4 × 6 cm) opening. The large box is dark; the small box is lit by three or four screened walls. The screened surfaces are painted with a fast-acting perythroid insecticide, such as permethrin or cypermethrin. The side opposite to the common opening in the large box has a sleeve of dark elastic material attached to allow fast emptying of the net contents into the large box. Inside the large box is a large (0.5–0.7 cm) mesh screen about 5 cm above the bottom of the box, used to retain large-plant debris; from the bottom of the box to the edge of the common opening a sloped surface of about 45° leads insects to the common opening. In the field, insects dropped into the large box are uncomfortable because of the darkness, hot temperature, and lower relative humidity. Most sawflies therefore move rapidly to the small, lit, cool, and more humid box. In the small box, insects are rapidly paralyzed and fall into a preservative (I use water saturated with table salt or alcohol). The roof of the small box may be transparent to allow the contents of the net to be easily examined 2 or 3 minutes after transferring a sweep sample to the box. In this way no time or specimens are lost.

Collecting devices used in passive methods are the Malaise trap (Townes 1972; Malaise 1937) and the yellow pan trap. The former is an interception trap that concentrates many sawflies (mainly Tenthredininae and Allantinae) toward the lightest portion of the roof, where there is a catching device with a preservative such as 95% alcohol. The Malaise trap is expensive to buy or make. The pan trap is any type of daffodil-yellow pan, a color attractive to sawflies and many other Hymenoptera. The trap is set at ground level or, when the vegetation is high, above ground level. Insects attracted to pan traps are caught in water and a preservative (I use water saturated with salt and detergent to break the surface tension to help drown the insects). Pan traps are very inexpensive. Masner and Goulet (1981) published a description of a combination of the above traps with use of a fast-acting insecticide. The position of these traps in the field is important for success. Collectors must learn to recognize flight paths. The best position for trapping sawflies is a sun-exposed and wind-free area. Pan traps are positioned at the edge of an open surface along taller vegetation and are exposed to the sun, at least in the morning. Malaise traps should have the catching device facing due south or toward the brightest source of light during the sawflies' maximum flight period.

Economic importance

Although most sawflies are associated with plants of little or no economic significance (willows, sedges, wild grasses), some are important pests in gardens, nurseries, agricultural crops, and forests, others are significant in controlling the spread of some weeds, and, finally, some are voracious predators and quite efficient pollinators.

Most serious sawfly problems are reported in forests. The normal problems are caused by wood-boring siricid and xiphydriid sawflies; leaf-feeding diprionid and nematine sawflies, such as *Pikonema* ssp., *Pristiphora erichsonii* (Hartig), and *Pristiphora geniculata* (Hartig); and leaf-mining sawflies, *Fenusa pusilla* (Lepeletier), *Messa nana* (Klug), *Profenusa thomsoni* (Konow), and *Scolioneura betuleti* (Klug). Attacks by some pamphiliid, xyelid, and argid sawflies in forests are less important and irregular.

In gardens and around properties the following species are usually abundant: birch leafminer, *Fenusa pusilla* (Lepeletier); imported currantworm, *Nematus ribesii* (Scopoli); mountain-ash sawfly, *Pristiphora geniculata* (Hartig); *Pristiphora aquilegiae* (Vollenhoven), on columbine; European pine false webworm, *Acantholyda erythrocephala* (Linnaeus); hawthorn leafmining sawfly, *Profenusa canadensis* (Marlatt); pear sawfly, *Caliroa cerasi* (Linnaeus); roseslug, *Endelomyia aethiops* (Fabricius); and curled rose sawfly, *Allantus cinctus* (Linnaeus), among others. These and some other species may be occasional or common problems only in some localities.

Sawflies are relatively minor pests in most agricultural crops. Small-fruit crops are damaged by *Pristiphora rufipes* Lepeletier, on currants, and by fruit-boring sawflies, *Hoplocampa* ssp. The European apple sawfly is spreading in southern Quebec and eastern Ontario and is becoming a major concern to apple growers. Grasses and grain crops may be attacked by stem sawflies (Cephidae) and by some species of *Dolerus* and *Pachynematus*. The wheat stem sawfly, previously a very serious problem in the prairies, is a minor problem with the advent of solid-stem wheat cultivars.

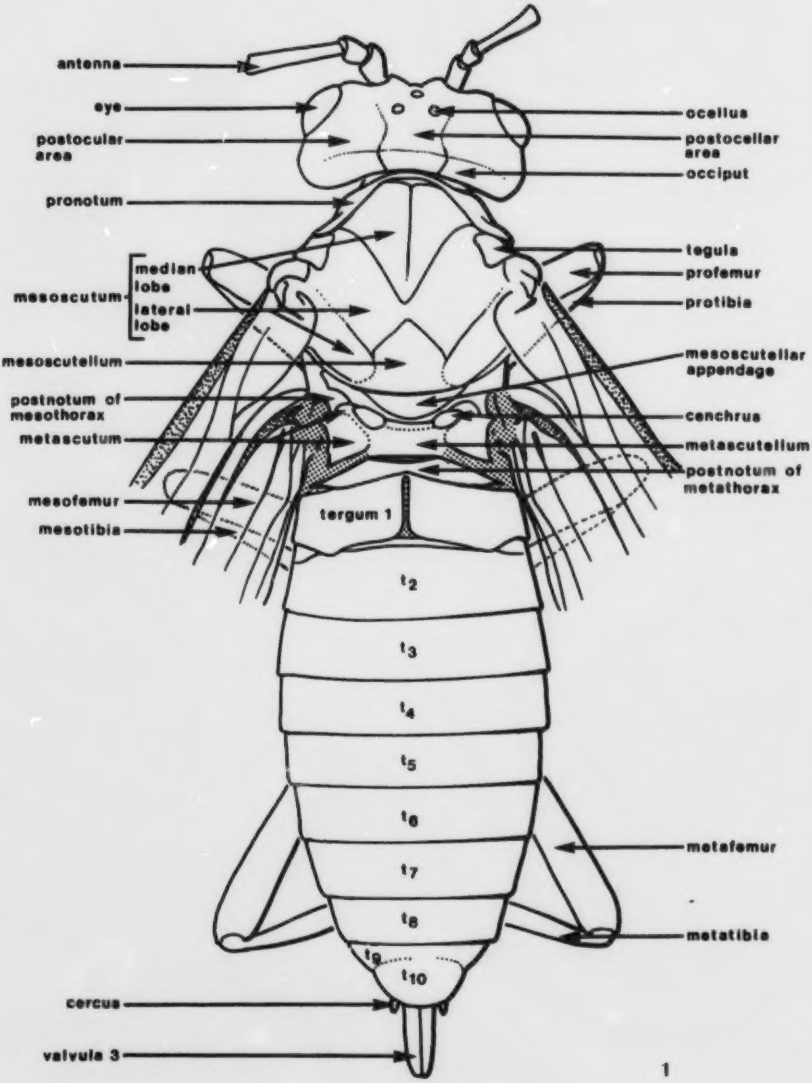
Sawflies are beneficial as parasitoids of wood-boring beetles (Orussidae) or in slowing the spread of weeds (*Schizocerella pilicornis* on *Portulaca*) and poisonous plants (several species of *Dolerus* on horsetails, *Arge humeralis* (Beauvois) on poison-ivy, and several species of *Rhadinoceraea* on *Veratrum*). Also, species of Tenthredinini are, as adults, predatory on several species of importance to agriculture and forestry, and those of *Tenthredo* pollinate a wide variety of flowering plants.

Structures of adults

The body of adult sawflies is clearly divided into head, thorax, and abdomen. Sawflies are distinguished from Apocrita (Hymenoptera that are not sawflies) by the anterior margin of the tergum 1, which appears as part of the abdomen rather than the thorax, though it is fused to the postnotum of the metathorax (Fig. 1). The following is based on Snodgrass (1935) and Wong (1963).

Head (Figs. 1–4). The head consists of a pair of large compound eyes and 3 ocelli (Fig. 3). The appendages consist of a pair of antennae usually between the compound eyes, a clypeus attached to the ventral margin of the head, a labrum attached to the clypeus, a pair of mandibles found behind the labrum and attached laterally to the ventral margin of the head capsule, a pair of maxillae behind the mandibles, and a labium behind the maxillae. The antenna is divided into three: the scape, the first segment near the head capsule; the pedicel, the second segment; and the flagellum, often divided into several joints (Fig. 4). Joints of the flagellum are called flagellomeres and are numbered consecutively from the joint nearest the pedicel. The maxilla and the labium each have a palp. Each palp is jointed; joints are called maxillary palpomeres and are numbered consecutively starting with the joint nearest the stipes (Fig. 3).

Thorax. The second or middle section of a sawfly body consists of three segments: the prothorax (the anterior segment), the mesothorax (the middle segment), and the metathorax (the posterior segment) (Fig. 2*a*). Sclerites of each segment are named using the prefix of the segment to which they belong (e.g., the coxa of the prothorax is the procoxa). Each segment of the thorax is subdivided into three regions: the notum (dorsal region), the pleuron (outer region), and the sternum (ventral region). The notum is subdivided into an anterior scutum and a posterior scutellum on the mesonotum and metanotum but is not subdivided on the pronotum (Fig. 1). The mesoscutum is divided in most sawflies into pairs of median and lateral lobes (Fig. 1). The metascutum is not divided, but laterally it has a pair of membranous and scale-like cenchri that are involved in wing folding (Fig. 1). The mesoscutellum of most sawflies has a crescent-shaped area at its posterior margin termed the mesoscutellar appendage (Fig. 1). The pleuron is divided into an anterior episternum and a posterior epimeron on the mesopleuron and metapleuron, but it is not clearly divided on the propleuron (Fig. 2*a*). The mesepimeron and the metepimeron in many sawflies are subdivided into a dorsal anepimeron and a ventral katepimeron (Fig. 2*a*). The metathoracic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mesoscutum
median lobe
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ocellus
postocellar area
occiput
tegula
profemur
protibia
mesoscutellar appendage
cenchrus
metascutellum
postnotum of metathorax
tergum 1
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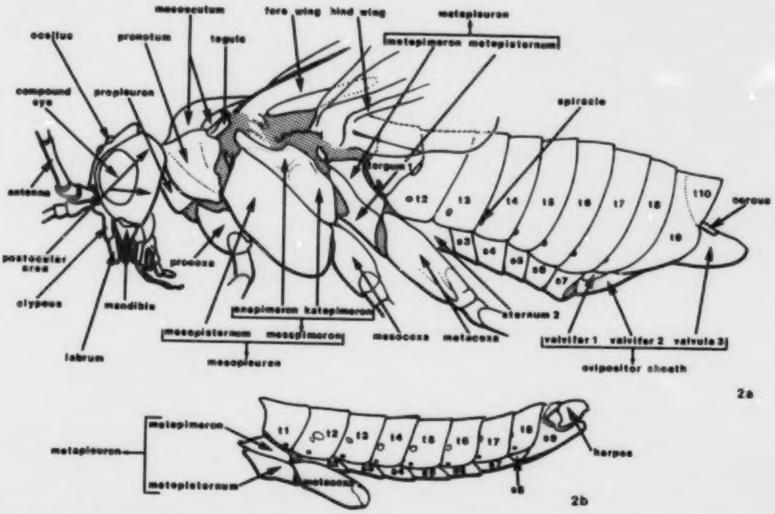
t_5
t_6
t_7
t_8
t_9
t_{10}
metafemur
metatibia
cercus
valvula 3
1

Fig. 1. Dorsal view of *Aglaostigma quattuordecimpunctatum* (Norton).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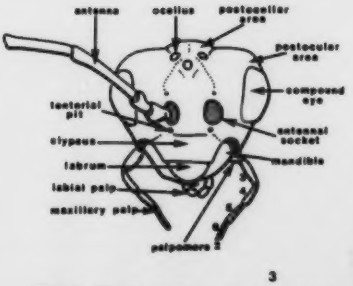
hind wing
metapleuron
metepimeron
metepisternum
ocellus
pronotum
tegula
compound eye
propleuron
spiracle
antenna
tergum 1
t2
t3
t4
t5
t6
t7
t8
t9
t10
cercus
s3
s4
s5
s6
s7
postocular area
procoxa
clypeus
mandible
labrum
anepimeron
katepimeron
mesepisternum
mesepimeron
mesopleuron
mesocoxa
metacoxa
sternum 2
valvifer 1
valvifer 2
valvula 3
ovipositor sheath
2a
metepimeron
metapleuron
metepisternum
metacoxa
t1
t2
t3
t4
t5
t6
t7
t8
s9
harpes
s8
2b

Fig. 2. Lateral view of female (*a*) and male (*b*) of *Aglaostigma quattuordecimpunctatum* (Norton).

spiracle (outer opening of respiratory system) is found between the metepisternum and the mesepimeron (usually concealed by posterior margin of mesepimeron) and the mesothoracic spiracle, between the mesepisternum and the pronotum (usually concealed by posterior margin of pronotum). In sawflies the prosternum is clearly outlined as opposed to the mesosternum and metasternum, which consist of a medioposterior fork-like sclerite (the anterior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postocellar area
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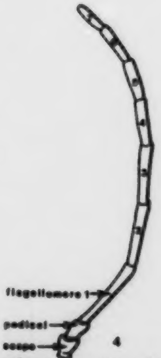
antennal socket
clypeus
mandible
labrum
labial palp
maxillary palp
palpomere 2
3


flagellomere 1
pedicel
scape
4

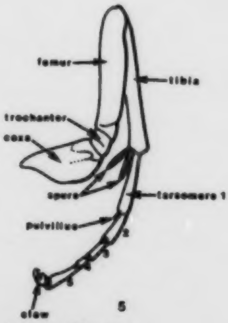
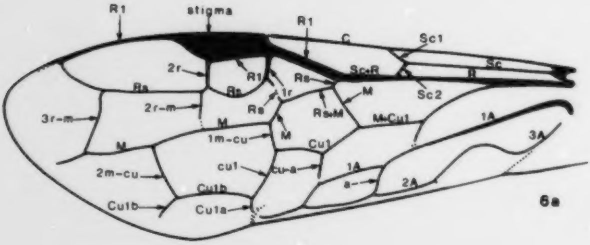

femur
tibia
trochanter
coxa
spurs
tarsomere 1
pulvillus
2
3
4
5
claw
5

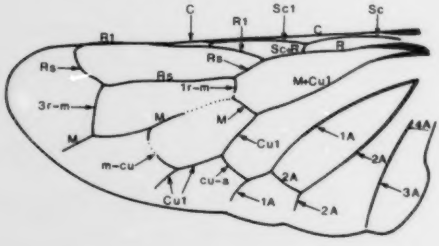
Fig. 3. Frontal view of head of *Aglaostigma quattuordecimpunctatum* (Norton).
Fig. 4. Antenna of *A. quattuordecimpunctatum*.
Fig. 5. Hind leg of *A. quattuordecimpunctatum*.

limits of the mesosternum and metasternum in sawflies are not fully understood). Wings are developed between the dorsal area of the pleuron and the lateral margin of the notum of the mesothorax and metathorax. A small and scale-like sclerite called the tegula is found at the base of the fore wing (Figs. 1, 2). Veins and cells of the wings are well developed in most sawflies; veins and cells are coded as in Figures 6–9. On each thoracic segment, a pair of legs are fully developed between the sternum and the pleuron. Each leg (Fig. 5) consists of a coxa, attached to the body wall, followed by a trochanter, a basal subdivision of the femur (hence double trochanter), a femur, a tibia, and a tarsus. The tarsus is 5 segmented in sawflies; segments are called tarsomeres; the last tarsomere ends with a pair of claws (Fig. 5). A pad-like structure, the pulvillis is located at the apex of tarsomeres 1–4 in almost all sawflies.

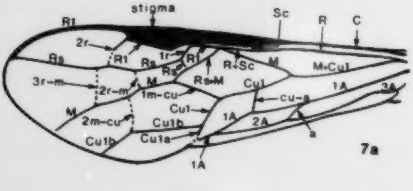
Abdomen. The third or last section of the body consists of 10 visible segments (Figs. 1, 2). Each segment consists of a dorsal tergum and a ventral sternum. Tergum 1 and rarely 2 are divided along the midline into two halves in most sawflies (Fig. 1), and terga 2–10 or 3–10 are not divided. In males terga 9 and 10 are hidden; in females they are fused, although the suture zone outlined by a furrow is still recognizable in most sawflies. Sternum 1 is lacking, sterna 2–7 in females (Fig. 2*a*) and 2–9 in males (Fig. 2*b*) are developed, sternum 8 in males is reduced to 2 lateral sclerites, and sternum 9 in males is long. Most abdominal segments lack appendages, except for segments 8 and 9 in females and 10 in both sexes. A pair of 1-segmented appendages, the cerci, are developed near the posterolateral margin of tergum 10 (Figs. 2*a*, 2*b*). The appendages of segments 8 and 9 in females form the egg laying blades or ovipositor. The ovipositor consists of 2 basal valvifers (called valvifer 1, attached to segment 8, and valvifer 2, attached to segment 9) and 3 apical valvulae (valvula 1 is attached to valvifer 1, and valvulae 2 and 3 to valvifer 2). Valvifers 1 and 2 and valvula 3 are visible externally and form the sheath (Fig. 2*a*), but valvulae 1 and 2 are usually hidden by valvula 3. In males, between tergum 10 and sternum 9, a portion of the copulatory organ is visible: a pair of lateral and articulated harpes and a pair of median penis valves (Fig. 2*b*).


R1
stigma
R1
C
Sc1
Sc
2r
R1
Rs
Rs
Sc+R
R
Sc2
Rs
1r
Rs
M
Rs+M
M+Cu1
1A
3A
3r-m
2r-m
M
1m-cu
M
M
Cu1
2m-cu
cu1
cu-a
1A
a
2A
Cu1b
Cu1b
Cu1a

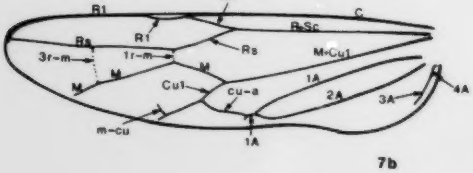
6a


C
Sc1
Sc
R1
R1
C
Sc+R
R
Rs
Rs
Rs
1r-m
M+Cu1
3r-m
M
M
M
Cu1
1A
4A
m-cu
cu-a
2A
2A
Cu1
1A
3A
2A

6b


stigma
R1
Sc
R
C
2r
Rs
R1
Rs
1r
R1
Rs
R+Sc
M
M+Cu1
3r-m
M
Rs+M
Cu1
1A
3A
2r-m
1m-cu
cu-a
M
Cu1
1A
2A
2m-cu
Cu1b
a
Cu1b
Cu1a
1A

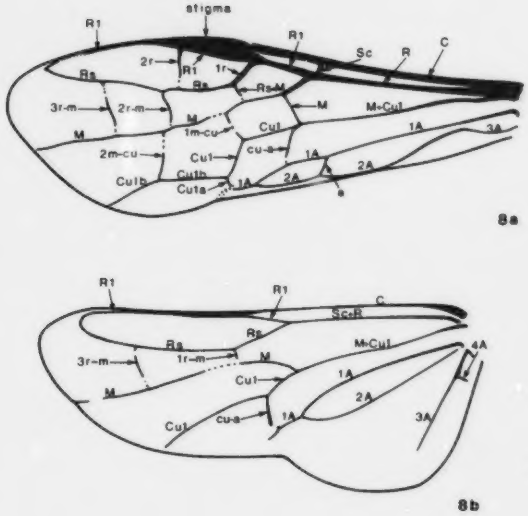
7a


R1
R1
C
R1
R+Sc
Rs
Rs
M+Cu1
3r-m
1r-m
M
M
1A
M
Cu1
cu-a
2A
3A
4A
m-cu
1A

7b

Fig. 6. *Pamphilius phyllisae* Middlekauff: (*a*) veins on fore wings, (*b*) veins on hind wings. A, Anal; C, Costa; Cu, Cubitus; M, Medius; R, Radius; Rs, Radial Sector; Sc, Subcosta. Notations are in lower case letters for crossveins and in capital letters for other veins. The plus sign (+) refers to fused veins. The minus sign (–) is a link between two veins for the notation of a crossvein.

Fig. 7. *Taxonus borealis* MacGillivray: (*a*) veins on fore wings, (*b*) veins on hind wings (see comments under Fig. 6).


stigma
R1
2r
R1
1r
R1
Sc
R
C
Rs
Rs
Rs-M
3r-m
2r-m
M
M
M+Cu1
1m-cu
Cu1
1A
3A
2m-cu
Cu1
cu-a
1A
Cu1b
Cu1b
Cu1a
1A
2A
2A
a
8a
R1
R1
C
Sc+R
Rs
Rs
M+Cu1
4A
3r-m
1r-m
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Cu1
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Cu1
cu-a
1A
3A
8b

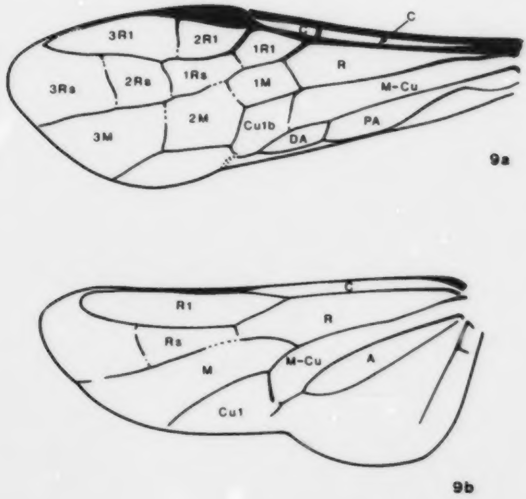

C
3R1
2R1
1R1
R
3Rs
2Rs
1Rs
1M
M-Cu
2M
Cu1b
PA
3M
DA
9a
C
R1
R
Rs
M
M-Cu
A
Cu1
9b

Fig. 8. ***Xiphydria maculata*** **Say: (*a*) veins on fore wings, (*b*) veins on hind wings (see comments under Fig. 6).**

Fig. 9. ***Xiphydria maculata*****: (*a*) cells on fore wings, (*b*) cells on hind wings. Names of cells are derived from frontal veins.**

Classification

The classification used here reflects Smith's classification (1979*a*), which was derived from Ross (1937), Benson (1938, 1951, 1952, 1958), Smith (1979*a*,) and Rasnitsyn (1980, 1988). My only departure from Smith's classification is to include, as Benson did previously (1952), Dolerinae as a tribe of Selandriinae. I am quite confident that the classification of families and subfamilies is generally sound, but that of the tribes and genera will probably be partly modified by further research.

I give original references for the few taxa described after the publication of the catalog of North American Hymenoptera Smith (1979*a*). Synonymies are not entered under each taxon because they are given completely in Smith (1979*a*).

Methods

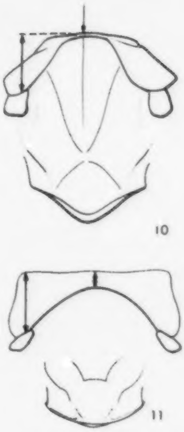
Specimens should be examined with a binocular-dissecting microscope with magnifications of 40× and 60×. However, most characters may be easily interpreted at magnifications lower than 40×.

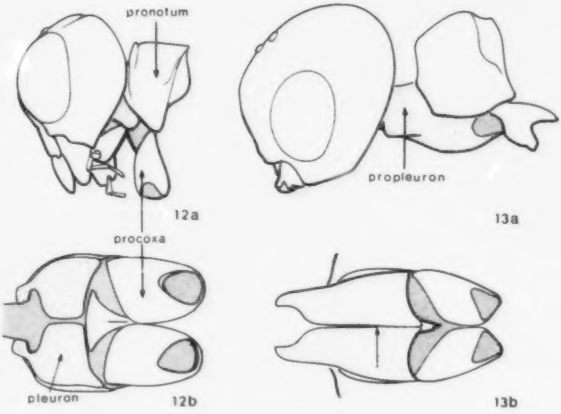
Most microscope lamps on the market are satisfactory for study under the magnification range stated above. However, the light quality is often poor, because glare from smooth surfaces of the specimen observed obscures the clarity of structures compared. Sharpness is markedly improved by diffusing the light beam with a small piece (2 × 2 cm or as big as 3 × 5 cm) of thick (0.02 mm) and translucent tracing acetate of the type used by draftspersons. Sharp views of structures are achieved when the acetate is less than 20 mm from the specimen, the sharpest views being between 1 and 3 mm.

Having proper specimens is important. Ideally, the perfect specimen should meet the following conditions: body and appendages not broken and very clean; abdomen not shrunk; wings spread away from abdomen; legs and antennae away from body and body neither covered with glue nor impaled by an oversized pin. Experienced researchers can learn to correctly identify less than perfect specimens, but first-time users of the keys would probably find it easier to proceed with well-preserved specimens.

The first statement of a key couplet is in opposition to that in the second half in the same couplet, except for statements in parentheses. Statements in parentheses consist of comments that clarify a statement or additional characters that reinforce the characterization of a taxon or taxa associated with the couplet.

Each illustration referred to in a couplet is not necessarily that of a taxon included in the couplet but is a similar expression of the character observed; other structures in the figure should therefore be ignored.





Figs. 10, 11. Dorsal view of pronotum. 10, *Nematus erythrogaster* Norton; 11, *Tremex columba* (Linnaeus).
Figs. 12, 13. Propleuron (stippled): (*a*) lateral view, (*b*) ventral view. 12, *T. leucostoma*; 13, *Xiphydria maculata* Say.

Key to superfamilies and families of Symphyta

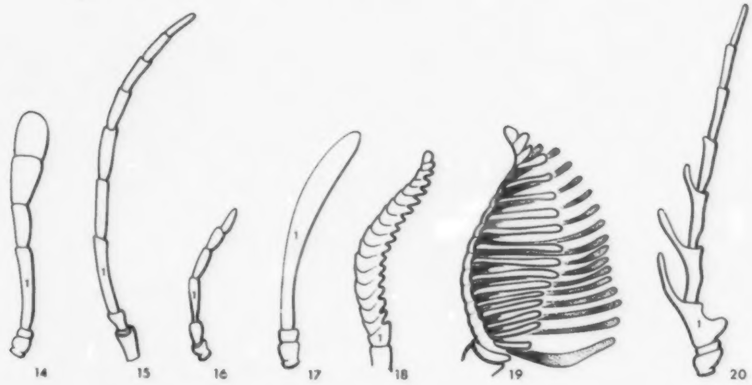
1 Pronotum from above markedly constricted medially: medial length less than 0.25 of maximum lateral length (Fig. 10) 2

Pronotum slightly or not constricted medially: medial length more than 0.4 of maximum lateral length (Fig. 11) 7

2(1) Propleuron short and head close to thorax (Fig. 12*a*): inner margins of pleura not adjacent or adjacent for distance less than posterior width of pleuron (Fig. 12*b*) .... Tenthredinoidea 3

Propleuron long and head far from thorax (Fig. 13*a*): inner margins of pleura adjacent for distance about twice width of pleuron (Fig. 13*b*) ....
Xiphydriidae: Xiphydriinae: ***Xiphydria*** **Latreille** (p. 210)

3(2) Length of flagellomere 1, 0.4–0.5 that of antenna (Fig. 14). Flagellum club-like toward apex (Fig. 14). In frontal view, postocular area clearly outlined beyond outer margin of eye (Figs. 22, 23). Abdominal terga 2–5 sharply folded above spiracle .... Cimbicidae (Key to genera p. 6)


1
14
15
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17
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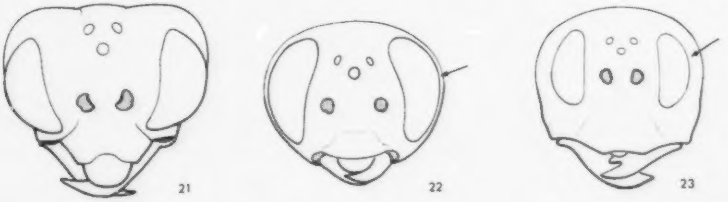
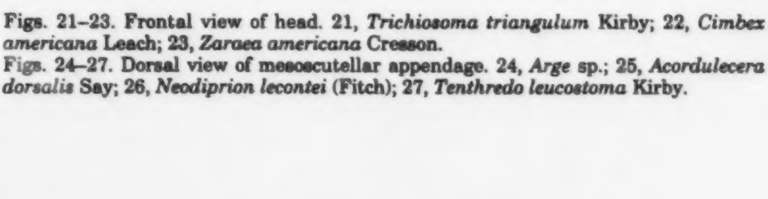
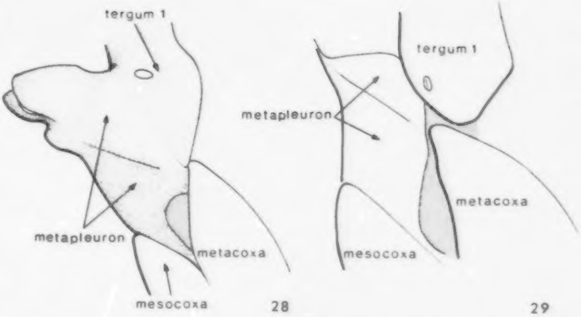
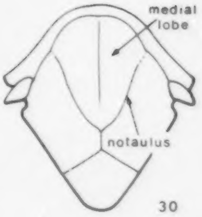
Figs. 14–20. Antenna. 14, *Zaraea americana* Cresson; 15, *Tenthredo leucostoma* Kirby; 16, *Acordulecera dorsalis* Say; 17, female of *Arge* sp.; 18, female of *Neodiprion lecontei* (Fitch); 19, male of *N. lecontei*; 20, male of *Cladius difformis* (Panzer).




mesoscutellum
mesoscutellar appendage
cenchrus
24
mesoscutellar appendage
25
fold
26
27

Figs. 21–23. Frontal view of head. 21, *Trichiosoma triangulum* Kirby; 22, *Cimbex americana* Leach; 23, *Zaraea americana* Cresson.
Figs. 24–27. Dorsal view of mesoscutellar appendage. 24, *Arge* sp.; 25, *Acordulecera dorsalis* Say; 26, *Neodiprion lecontei* (Fitch); 27, *Tenthredo leucostoma* Kirby.





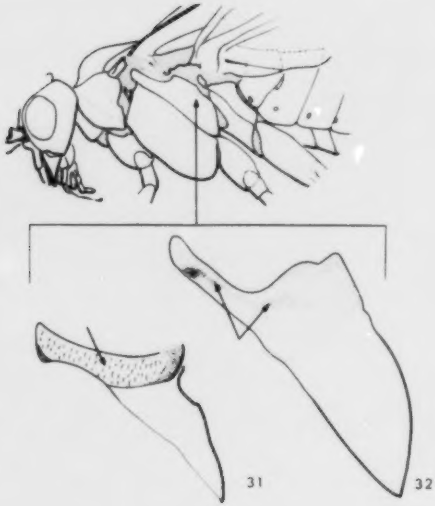
Figs. 28, 29. Tergum 1 and metapleuron. 28, *Arge* sp.; 29, *Tenthredo leucostoma* Kirby.
Fig. 30. Mesonotum of *Arge* sp.

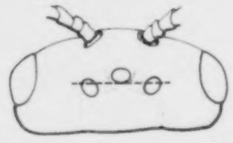
Length of flagellomere 1 less than one-third (Figs. 15, 16, 18–20) or more than 0.7 that of antenna (Fig. 17). Flagellum thread-, sausage-, or comb-like (Figs. 15–20), or slightly club-like. In frontal view, postocular area not outlined beyond all of outer margin of eye, especially in ventral half of eye (Fig. 21). Abdominal terga 2–5 not folded above spiracle (in air-dried specimens, abdomen may collapse and appear folded) 4

4(3) Flagellum unsegmented or with 4 flagellomeres (Figs. 16, 17). Abdominal tergum 1 extended to metacoxa and fused with metapleuron (internal ridges visible if surface pale, but sclerites clearly fused at surface) (Fig. 28). Mesoscutellar appendage fused with mesoscutellum and its posterior margin much below main plane of mesoscutellum (Figs. 26, 27) 5

Flagellum with 5 or more flagellomeres (Figs. 15, 18–20). Abdominal tergum 1 not extended laterally to metacoxa and not fused with metapleuron (Fig. 29). Mesoscutellar appendage outlined by furrow at least laterally (extremely narrow and maybe hidden in adults of *Diprion*) and on the same plane as mesoscutellum (Figs. 24, 25) 6

5(4) Flagellum unsegmented, as long as or longer than 0.7 of length of antenna (Fig. 17). Notaulus clearly outlined (Fig. 30). Surface near lateral margin of mesoscutellum round (Fig. 27) .... Argidae (Key to genera p. 51)

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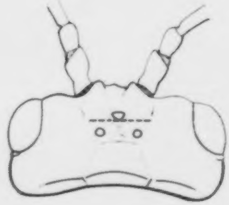
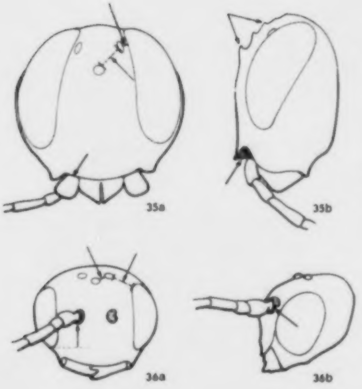
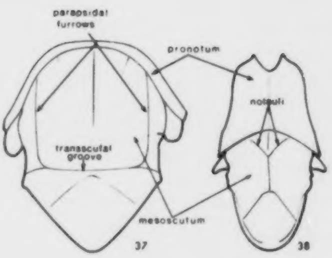

34

Figs. 31, 32. Dorsal view of head. 31, *Aglaostigma quattuordecimpunctatum* (Norton); 32, *Neodiprion lecontei* (Fitch).
Figs. 33, 34. Anepimeron of mesopleuron (stippled). 33, *N. lecontei*; 34, *Tenthredo leucostoma* Kirby.

Flagellum with 4 flagellomeres (Fig. 16). Flagellomere 1 as short as or shorter than one-third of length of antenna (Fig. 16). Notaulus not outlined. Surface near lateral margin of mesoscutellum sharply folded (Fig. 26) .... Pergidae: Acordulecerinae: ***Acordulecera*** **Say** (p. 49)

6(4) Flagellum with 15–20 flagellomeres. Flagellomeres saw- or comb-like (with more than 15 comb-like flagellomeres) (Figs. 18, 19). Ocelli in dorsal view almost in a straight line (a transverse line from the posterior margin of middle ocellus would run through middle of lateral ocelli) (Fig. 33). Anepimeron of mesopleuron mostly flat (Fig. 31) .... Diprionidae (Key to genera p. 66)

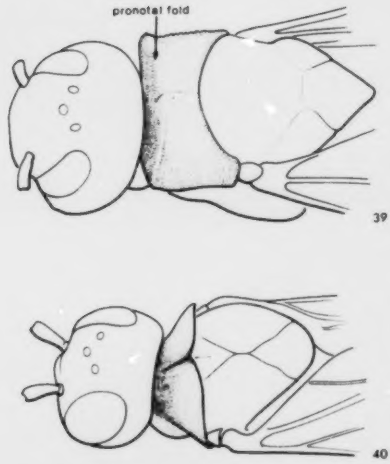


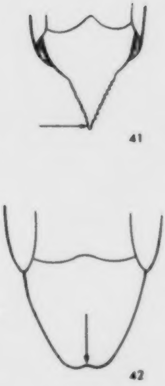


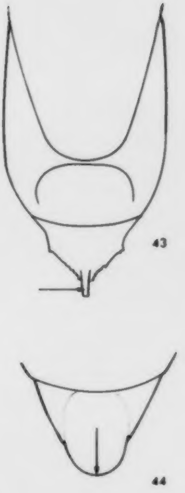
Figs. 35, 36. Head: (*a*) frontal view, (*b*) lateral view. 35, *Orussus occidentalis* (Cresson); 36, *Hartigia trimaculata* (Say).
Figs. 37, 38. Pronotum and mesonotum. 37, *O. occidentalis*; 38, *H. trimaculata*.

Flagellum with 5–10 flagellomeres. Flagellomeres cylindrical, weakly saw- or club-like, or with fewer than 4 comb-like flagellomeres (Figs. 15, 20). Ocelli in dorsal view clearly forming an angle (a transverse line from posterior margin of middle ocellus would run at most on the anterior margin of lateral ocelli) (Fig. 34). Anepimeron of mesopleuron clearly elevated along dorsoposterior margin (Fig. 32) .... Tenthredinidae (Key to subfamilies p. 73)

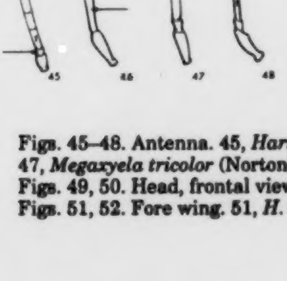
7(1) Antenna inserted below eye under sharp transverse ridge (Fig. 35). Median ocellus surrounded by 3 or 4 pairs of strongly raised and scallop-like pits along anterior margin (Fig. 35*b*). Lateral ocellus much nearer to eye margin than to median ocellus (Fig. 35*a*). Mesonotum with transverse transscutal articulation, parallel parapsidal furrows, and very weakly outlined notauli (Fig. 37). Tergum 1 not divided medially .... Orussoidea: Orussidae: ***Orussus*** **Latreille** (p. 213)

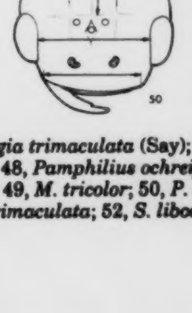


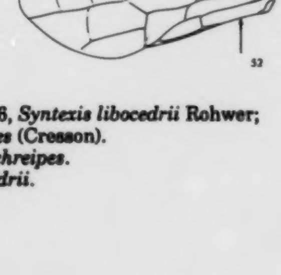




Figs. 39, 40. Slanted view of dorsal surface of pronotum (stippled). 39, *Tremex columba* (Linnaeus); 40, *Syntexis libocedrii* Rohwer.
Figs. 41, 42. Last abdominal sternum of male. 41, *T. columba*; 42, *Hartigia trimaculata* (Say).
Figs. 43, 44. Tergum 9 of female. 43, *T. columba*; 44, *H. trimaculata*.







Figs. 45–48. Antenna. 45, *Hartigia trimaculata* (Say); 46, *Syntexis libocedrii* Rohwer; 47, *Megaxyela tricolor* (Norton); 48, *Pamphilius ochreipes* (Cresson).
Figs. 49, 50. Head, frontal view. 49, *M. tricolor*; 50, *P. ochreipes*.
Figs. 51, 52. Fore wing. 51, *H. trimaculata*; 52, *S. libocedrii*.

Antenna inserted between eyes above lowest margin of eye and not under transverse ridge (Fig. 36). Median ocellus at most surrounded by ridges or furrows, and pits, if developed, not raised along anterior margin (Fig. 36*b*). Lateral ocellus as close as or closer to median ocellus as to nearest margin of eye (Fig. 36*a*). Mesonotum without transscutal groove and parapsidal furrows but usually with convergent notauli (Fig. 38). Tergum 1 divided medially ... 8

8(7) Pronotum collar-shaped: in front of transverse pronotal fold almost vertical, behind it almost horizontal (Fig. 39). Posterior margin of last tergum in female (Fig. 43) and last sternum in male (Fig. 41) with a tube-like process at midline .... Siricoidea: Siricidae (Key to genera p. 204)

Pronotum evenly sloping down (Fig. 40). Posterior margin of last tergum in female (Fig. 44) and last sternum in male (Fig. 42) straight or round 9

9(8) Medial length of pronotum greater than that of medial furrow of mesoscutum (Fig. 38). Protibia with 1 apical spur. Metatibia with 0–2 preapical spurs 10

Medial length of pronotum shorter than that of medial furrow of mesoscutum. Protibia with 2 apical spurs. Metatibia with 3 or 4 preapical spurs 11

10(9) Pedicel about as long as flagellomere 1 (Fig. 46). Veins 2A and 3A of fore wing sinuous between base and crossvein (Fig. 51). Mesoscutellum in cross section flat and folded laterally. Cenchri developed .... Anaxyelidae: ***Syntexis*** **Rohwer** (p. 201)

Pedicel much shorter than flagellomere 1 (Fig. 45). Vein 2A and 3A of fore wing straight between base and crossvein (Fig. 52). Mesoscutellum in cross section regularly convex. Cenchri lacking .... Cephoidea: Cephidae: Cephinae (Key to genera p. 192)

11(9) Flagellomere 1 wider than 2 and as long as or longer than remainder of flagellum (Fig. 47). Width of clypeus at base less than 0.6 of distance between eyes (Fig. 49). Postocellar area in dorsal view about twice as wide as long (Fig. 49) .... Xyeloidea: Xyelidae (Key to genera p. 32)

Flagellomere 1 about as wide as 2 and much shorter than remainder of flagellum (Fig. 48). Width of clypeus at base about as wide as distance between eyes (Fig. 50). Postocellar area in dorsal view longer than wide (Fig. 50) .... Megalodontoidea: Pamphiliidae (Key to genera p. 40)

Clé des superfamilles et des familles de Symphyta

1 Pronotum présentant un étranglement médian prononcé en vue dorsale : longueur médiane inférieure à 0,25 fois la longueur latérale maximale (fig. 10) 2

Pronotum sans étranglement ou avec un léger étranglement médian : longueur médiane supérieure à 0,4 fois la longueur latérale maximale (fig. 11) 7

2(1) Propleure court et tête près du thorax (fig. 12*a*) : bords internes des pleures non adjacents ou adjacents sur une distance inférieure à la largeur postérieure du pleure (fig. 12*b*) .... Tenthredinoidea 3

Propleure long et tête loin du thorax (fig.13*a*) : bords internes des pleures adjacents sur une distance d'environ deux fois la largeur du pleure (fig. 13*b*) ....
Xiphydriidae : Xiphydriinae : ***Xiphydria*** **Latreille** (p. 209)

3(2) Article 1 du flagelle mesurant 0,4 à 0,5 fois la longueur de l'antenne (fig. 14). Flagelle en forme de massue vers l'apex (fig. 14). En vue frontale, région postoculaire clairement définie au-delà du bord externe de l'oeil (fig. 22, 23). Terga abdominaux 2 à 5 fortement repliés au-dessus des stigmates .... Cimbicidae (clé des genres p. 62)

Article 1 du flagelle mesurant moins du tiers de la longueur (fig. 15, 16, 18 à 20) ou plus de 0,7 fois la longueur de l'antenne (fig. 17). Flagelle filiforme, en forme de saucisse, ou en forme de peigne (fig. 15 à 20), ou légèrement en forme de massue. En vue frontale, région postoculaire non définie au-delà de tout le bord externe de l'oeil, principalement dans la moitié ventrale de l'oeil (fig. 21). Terga abdominaux 2 à 5 non repliés au-dessus des stigmates (chez les spécimens desséchés, l'abdomen peut s'affaisser et paraître replié) 4

4(3) Flagelle non segmenté ou comportant 4 articles (fig. 16, 17). Tergum abdominal 1 s'étendant jusqu'au métacoxa et fusionné avec le métapleure (carènes internes visibles dans le cas d'une surface pâle, mais sclérites nettement fusionnés à la surface) (fig. 28). Appendice mésoscutellaire fusionné au mésoscutellum et avec bord postérieur situé bien au-dessous du plan principal du mésoscutellum (fig. 26, 27) 5

Flagelle comportant 5 articles ou plus (fig. 15, 18 à 20). Tergum abdominal 1 ne s'étendant pas latéralement jusqu'au métacoxa et non fusionné au métapleure (fig. 29). Appendice mésoscutellaire délimité par un sillon au moins latéralement (extrêmement étroit et parfois caché chez les adultes de Diprion) et situé sur le même plan que le mésoscutellum (fig. 24, 25) 6

5(4) Flagelle non segmenté, d'une longueur égale ou supérieure à 0,7 fois la longueur de l'antenne (fig. 17). Notaulix clairement définie (fig. 30). Surface arrondie près du bord latéral du mésoscutellum (fig. 27) .... Argidae (clé des genres p. 53)

Flagelle de 4 articles (fig. 16). Longueur de l'article 1 du flagelle égale ou inférieure au tiers de la longueur de l'antenne (fig. 16). Notaulix non définie. Surface située près du bord latéral du mésoscutellum fortement repliée (fig. 23) .... Pergidae : Acordulecerinae : ***Acordulecera*** **Say** (p. 49)

6(4) Flagelle de 15 à 20 articles. Articles serriformes ou pectinés (plus de 15 articles pectinés) (fig.18, 19). En vue dorsale, ocelles situés presque en ligne droite (une ligne transverse partant du bord postérieur de l'ocelle médian passerait au milieu des ocelles latéraux) (fig. 33). Anépimère du mésopleure généralement non soulevé (fig. 31) .... Diprionidae (clé des genres p. 68)

Flagelle de 5 à 10 articles. Articles cylindriques, faiblement serriformes ou en forme de massue, ou moins de 4 articles pectinés (fig.15, 20). En vue dorsale, ocelles formant nettement un angle (une ligne transverse partant du bord postérieur de l'ocelle médian passerait au plus sur le bord antérieur des ocelles latéraux) (fig. 34). Anépimère du mésopleure nettement soulevé le long du bord dorsal postérieur (fig. 32) .... Tenthredinidae (clé des sous-familles p. 77)

7(1) Antennes insérées sous l'oeil, sous une carène transverse bien définie (fig. 35). Ocelle médian entouré de 3 ou 4 paires de fosses en forme d'écailles fortement surélevées le long du bord antérieur (fig. 35*b*). Ocelle latéral beaucoup plus près du bord de l'oeil que de l'ocelle médian (fig.35 *a*). Mésonotum à articulation transverse transcutale, à sillons parapsidaux parallèles, et à notaulices très faiblement définies (fig. 37). Tergum 1 non divisé en partie médiane .... Orussoidea : Orussidae : ***Orussus*** **Latreille** (p. 213)

Antennes insérées entre les yeux au-dessus du bord le plus bas de l'oeil et non sous une carène transverse (fig. 36). Ocelle médian entouré tout au plus de carènes ou de sillons, et de fosses, si présentes, non surélevées le long du bord antérieur (fig. 36*b*). Ocelle latéral aussi près ou plus près de l'ocelle médian que du bord le plus proche de l'oeil (fig. 36*a*) Mésonotum sans sillon transcutal ni sillons parapsidaux, mais généralement pourvu de notaulices convergentes (fig. 38). Tergum 1 divisé en partie médiane 8

8(7) Pronotum en forme de collet : presque vertical devant le pli pronotal transverse, presque horizontal derrière ce dernier (fig. 39). Bord postérieur du dernier tergum de la femelle (fig. 43) et du dernier sternum du mâle (fig. 41) pourvu au milieu d'un appendice en forme de tube ....
.... Siricoidea : Siricidae (clé des genres p. 205)

Pronotum en pente régulière (fig. 40). Bord postérieur du dernier tergum de la femelle (fig. 44) et du dernier sternum du mâle (fig. 42) rectiligne ou arrondi 9

9(8) Longueur médiane du pronotum supérieure à celle du sillon médian du mésoscutum (fig. 38). Protibia pourvu d'un éperon apical. Métatibia pourvu de 0 à 2 éperons préapicaux
.... 10

Longueur médiane du pronotum inférieure à celle du sillon médian du mésoscutum. Protibia pourvu de deux éperons apicaux. Métatibia pourvu de 3 à 4 éperons préapicaux 11

10(9) Pédicelle presque aussi long que l'article 1 du flagelle (fig. 46). Nervures 2A et 3A de l'aile antérieure ondulées entre la base et la nervure transversale (fig. 51). Mésoscutellum, en section transversale, aplati et replié latéralement. Cenchri présents .... Anaxyelidae : ***Syntexis*** **Rohwer** (p. 201)

Pédicelle beaucoup plus court que l'article 1 du flagelle (fig. 45). Nervures 2A et 3A de l'aile antérieure rectilignes entre la base et la nervure transversale (fig. 52). Mésoscutellum, en section transversale, régulièrement convexe. Absence de cenchri ....
.... Cephoidea : Cephidae : Cephinae (clé des genres p. 195)

11(9) Article 1 du flagelle plus large que l'article 2 et aussi long ou plus long que le reste du flagelle (fig. 47). Base du clypéus d'une largeur inférieure à 0,6 fois la distance entre les yeux (fig. 49). En vue dorsale, région postcellaire environ deux fois plus large que longue (fig. 49) .... Xyeloidea : Xyelidae (clé des genres p. 33)

Article 1 du flagelle à peu près aussi large que l'article 2 et beaucoup plus court que le reste du flagelle (fig. 48). Base du clypéus d'une largeur à peu près égale à la distance entre les yeux (fig 50). En vue dorsale, région postocellaire plus longue que large (fig. 5) .... Megalodontoidea : Pamphiliidae (clé des genres p. 42)

Superfamily Xyeloidea

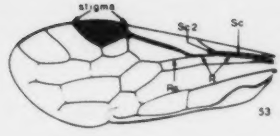
Diagnosis. Adults of the superfamily are easily distinguished from those of other superfamilies of Symphyta by their antennae with an enormous flagellomere 1 followed by short and narrow flagellomeres and by the presence of 1 or 2 crossveins in R_1 cell beyond stigma.

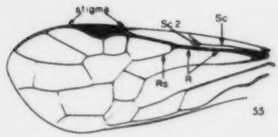
Diversity. There is only one family, Xyelidae (Rasnitsyn 1980).

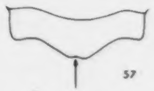
FAMILY XYELIDAE

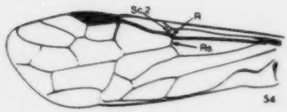
Diagnosis. See Xyeloidea.

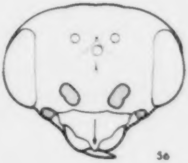
Diversity. Xyelidae consists of four subfamilies, eight tribes, 40 genera, and 107 species (Benson 1945*a*; Smith 1978, 1990). Most of the above classification is based on extinct taxa. The family currently consists of the following living taxa: two subfamilies, four tribes, five genera, and 47 species (Smith 1978, 1990). In North America two subfamilies, four tribes, five genera, and 30 species are known (Smith 1979*a*, 1990). In Canada five genera and 13 species have been recorded, although 17 species are expected.

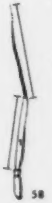


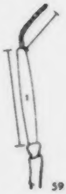












Figs. 53–55. Fore wing. 53. *Xyela bakeri* Konow; 54. *Macroxyela ferruginea* (Say); 55, *Pleroneura brunneicornis* Rohwer.
Figs. 56, 57. Clypeus. 56, *M. ferruginea*; 57, *Megaxyela tricolor* (Norton).
Figs. 58, 59. Antenna. 58, *Xyelecia nearctica* Ross; 59, *P. brunneicornis*.

Key to subfamilies, tribes, and genera of Xyelidae

(modified from Benson 1945*a*)

1 Fore wing with junction of veins Sc_2 and R basal to that of Rs and R (Figs. 53, 55) 2

Fore wing with junction of veins Sc_2 and R apical to that of Rs and R (Fig. 54) .... Macroxyelinae: Macroxyelini 4

2(1) Vein Sc of fore wing very close to vein R (apparently fused) (Fig. 53). Stigma twice as long as wide (Fig. 53). Wings without setae. Body shorter than 5 mm .... Xyelinae: Xyelini: ***Xyela* Dalman** (p. 34)

Vein Sc of fore wing clearly removed from R (Fig. 55). Stigma three times as long as wide (Fig. 55). Wings pubescent. Body longer than 5 mm 3

3(2) Antenna with 10 flagellomeres. Length of combined flagellomeres 2–10 half that of flagellomere 1 (Fig. 59). Body shorter than 8 mm. Terga 2–6 or 2–7 with longitudinal furrow above spiracle .... Xyelinae: Pleroneurini: ***Pleroneura* Konow** (p. 36)

Antenna with 24 or more flagellomeres. Length of combined flagellomeres 2 to the last one about as long as that of flagellomere 1 (Fig. 58). Body 8 mm or longer. Terga 2–7 without longitudinal furrow .... Macroxyelinae: Xyeleciini: ***Xyelecia* Ross** (p. 37)

4(1) Apical margin of clypeus with long projection medially (Fig. 56) .... ***Megaxyela*** **Ashmead** (p. 38)

Apical margin of clypeus without midline projection but with slight notch medially (Fig. 57) .... ***Macroxyela*** **Kirby** (p. 38)

Clé des sous-familles, des tribus et des genres de Xyelidae

(modifiée de Benson 1945*a*)

1 Jonction des nervures Sc_1 et R de l'aile antérieure basale par rapport à celle des nervures Rs et R (fig. 53, 55) 2

Jonction des nervures Sc_1 et R de l'aile antérieure apicale par rapport à celle des nervures Rs et R (fig. 54) .... Macroxyelinae : Macroxyelini 4

2(1) Nervure Sc de l'aile antérieure très proche de la nervure R (apparemment fusionnées) (fig. 53). Stigma deux fois plus long que large (fig. 53). Ailes dépourvues de soies. Longueur du corps inférieure à 5 mm. .... Xyelinae : Xyelini : ***Xyela*** **Dalman** (p. 34)

Nervure Sc de l'aile antérieure éloignée de la nervure R (fig. 55). Stigma trois fois plus long que large (fig. 55). Ailes pubescentes. Longueur du corps supérieure à 5mm 3

3(2) Antenne de 10 articles. Longueur du flagelle, de l'article 2 à l'article 10 combinés, égale à la moitié de celle de l'article 1 (fig. 59). Longueur du corps inférieure à 8 mm. Terga 2 à 6 ou 2 à 7 pourvus d'un sillon longitudinal au-dessus du stigmate .... Xyelinae : Pleroneurini : ***Pleroneura*** **Konow** (p. 36)

Antenne de 24 articles ou plus. Longueur du flagelle, de l'article 2 au dernier article combinés, à peu près égale à celle de l'article 1 (fig. 58). Longueur du corps égale ou supérieure à 8 mm. Absence de sillon longitudinal sur les terga 2 à 7 .... Macroxyelinae : Xyeleciini : ***Xyelecia*** **Ross** (p. 37)

4(1) Bord apical du clypéus pourvu d'une longue projection médiane (fig. 56) .... ***Megaxyela*** **Ashmead** (p. 38)

Bord apical du clypéus sans projection sur la ligne médiane, mais pourvu d'une légère encoche médiane (fig. 57) .... *Macroxyela* Kirby (p. 38)

Subfamily Xyelinae

Diagnosis. Adults of Xyelinae are distinguished from those of other subfamilies by the short body (excluding the ovipositor in the female, smaller than 8 mm), by the fore wing junction Sc$_1$ and R basal to that of R and Rs, by the 10-jointed flagellum, and by the longitudinal furrow lined with membrane above the spiracle of terga 2–6 or 2–7.

Diversity. The subfamily consists of three tribes, 11 genera, and 58 species (Smith 1978, 1990). Most of these taxa are extinct. The living fauna is represented by two tribes, two genera, and 38 species (Smith 1978, 1990). In North America two tribes, two genera, and 23 species are known (Smith 1979*a*, 1990). In Canada two tribes, two genera, and nine species are recorded, but 14 species are expected.

Host. Larvae of this subfamily attack coniferous shoots or staminate flowers of pine and fir (Smith 1979*a*).

Tribe Xyelini

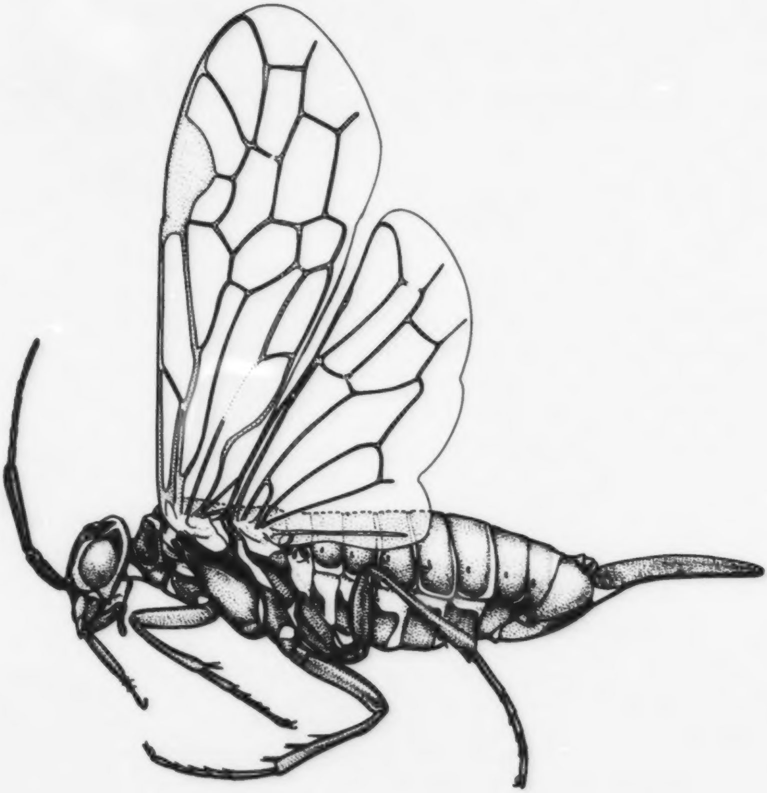
Diagnosis. Adults of Xyelini are distinguished from those of other tribes of the family by the short body (excluding the ovipositor in female, smaller than 5 mm), by the broad stigma (about twice as long as wide), and by the short flagellomere 1 (as long as the combined length of flagellomeres 2–10).

Diversity. The tribe consists of five extinct and one living genera, and 13 extinct and 33 living species (Smith 1978, 1990).

Genus *Xyela* Dalman

Diagnosis. See Xyelini.

Diversity. *Xyela* consists of two subgenera (all living species belong to subgenus *Xyela*) and 33 species (29 are living) (Smith 1978, 1990). The genus is restricted to temperate regions of Eurasia and North America. In North America 18 species are known (Smith 1979*a*, 1990). In Canada seven species are recorded, but eight are expected.



Xyelidae: ***Xyela***

Host. Larvae feed in staminate flowers (most species) or in shoots (one species) of various species of pine. (Smith 1979*a*).

Comments. Burdick (1961) revised the North American species of the genus.

Tribe Pleroneurini

Diagnosis. Adults of Pleroneurini are distinguished from those of other genera of the family by the moderate size of the body (excluding the ovipositor in female, 6–8 mm in length), by the narrow stigma (three times longer than wide), and by the long flagellomere 1 (twice as long as the combined length of flagellomeres 2–10).

Diversity. The tribe consists of one genus and eight species (Smith 1978).

Genus *Pleroneura* Konow

Diagnosis. See Pleroneurini.

Diversity. *Pleroneura* genus occurs in temperate regions of Eurasia and North America (Smith 1978). In North America five species are known (Smith 1979*a*). In Canada two species are recorded, but five are expected. Most species are found west of the Rocky Mountains (Smith 1979*a*).

Host. Larvae feed in new buds and shoots of various species of fir (Smith 1967, 1979*a*).

Comments. Smith, Ohmart, and Dahlsten (1977) revised the North American species of the genus.

Subfamily Macroxyelinae

Diagnosis. Adults of Macroxyelinae are distinguished from those of other subfamilies by the long body (excluding the ovipositor in female, longer than 8 mm) and the fore wing junction of Rs and R basal to that of R and Sc_1 (except *Xyelicia* with 24 or more flagellomeres).

Diversity. The subfamily consists of five tribes, 13 genera, and 22 species (Smith 1978). Most of these categories are extinct (Smith 1978). The living fauna consists of two tribes, three genera, and nine species (Smith 1978). In North America two tribes, three genera, and seven species are known (Smith 1979*a*). In Canada two tribes, three genera, and four species are recorded, but seven species are expected.

Host. Larvae of the subfamily feed on firs and deciduous trees (Smith 1979*a*).

Tribe Xyeleciini

Diagnosis. Adults of Xyeleciini are distinguished readily from those of other tribes of the family by the 24 or more flagellomeres and by the short flagellomere 1 (subequal to the combined length of remaining flagellomeres).

Diversity. The tribe consists of three extinct and one living genera, and three extinct and two living species (Smith 1978).

Genus *Xyelecia* Ross

Diagnosis. See Xyeleciini.

Diversity. *Xyelecia* consists of two species, one in eastern Asia and the other, *X. nearctica* Ross, in western North America (Smith 1978).

Host. Larvae feed in shoots of fir (Smith 1978).

Comments. Ross (1932) and Smith (1964) characterized the single species. Smith (1967) described the larvae.

Tribe Macroxyelini

Diagnosis. Adults of Macroxyelini are distinguished from those of other tribes by the long body (excluding ovipositor in female, longer than 8 mm) and by the fore wing junction Rs and R basal to R and Sc_1.

Diversity. The tribe consists of two genera, and one extinct and seven living species (Smith 1978).

Host. Larvae feed on leaves of deciduous trees (Smith 1979*a*).

Genus *Macroxyela* Kirby

Diagnosis. Adults of *Macroxyela* are distinguished from those of other genera of the family by the long body (excluding the ovipositor in female, longer than 9 mm) and by the small notch of the apical margin of the clypeus.

Diversity. The genus consists of three North American species (Ross 1932). In Canada one species is recorded, but three are expected.

Host. Larvae feed on leaves of elm (Smith 1979*a*).

Comments. Ross (1932) revised the North American species of the genus. However, the genus is in need of study.

Genus *Megaxyela* Ashmead

Diagnosis. Adults of *Megaxyela* are distinguished from those of other genera of the family by the long body (excluding the ovipositor in female, longer than 9 mm) and by the long middle projection of the apical margin of the clypeus.

Diversity. The genus consists of one extinct and four living species (Smith 1978). In North America three species are known (Smith 1979*a*). In Canada two species are recorded, but three are expected. The genus is restricted to temperate regions of eastern Asia and North America (Smith 1979*a*).

Host. Larvae feed on leaves of *Carya* and *Juglans* (Smith 1979*a*).

Comments. Ross (1932) revised the genus. *Megaxyela aviingrata* (Dyar) is a junior synonym of *M. tricolor* (Norton). The genus needs study, but specimens are still very rare in collections.

Superfamily Megalodontoidea

Diagnosis. Adults of Megalodontoidea are distinguished from those of other superfamilies of Symphyta by the very long postocellar area and by the clypeus, which is as wide as the distance between eyes.

Diversity. The superfamily consists of two families, four tribes, nine genera and over 200 species (Benson, 1945*b*, 1952). Pamphiliidae is the only family recorded in North America, including Canada; the other family, Megalodontidae, is restricted to Eurasia. The members of the superfamily are restricted to temperate and boreal regions of Eurasia and North America (Benson 1945*b*).

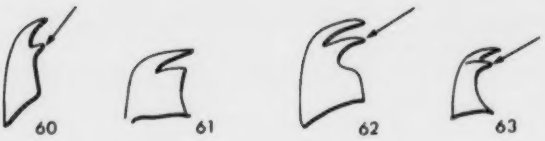
Host. Larvae feed on deciduous and coniferous trees and on herbaceous plants (Benson, 1945*b*). Larvae feed singly or in groups, spinning webs and making large nests filled with discarded food, cast-off skins, and frass (Middlekauff 1958).

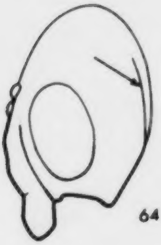
FAMILY PAMPHILIIDAE

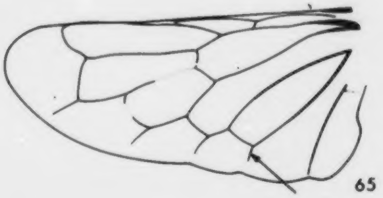
Diagnosis. Adults of Pamphiliidae are distinguished from those of Megalodontidae by the seta-like antennae and by the lengthwise fold on abdominal terga 2–5, above the spiracle.

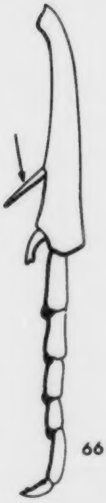
Diversity. The family consists of two subfamilies, four tribes, five genera, and over 160 species (Benson 1945*b*; Middlekauff 1958, 1964). In North America two subfamilies, three tribes, and four genera occur, all of which are found in Canada (Middlekauff 1958, 1964). The family is diverse in temperate and boreal forested regions of Eurasia and North America (Benson 1945*b*).

Host. Larvae feed on leaves of coniferous and deciduous trees (Benson 1945*b*).









Figs. 60–63. Claw. 60, *Acantholyda erythrocephala* (Linnaeus); 61–63, *Pamphilius* sp. (from Middlekauff 1964).
Fig. 64. Lateral view of head of *A. brunnicans* (Norton).
Fig. 65. Hind wing of *A. erythrocephala*.
Fig. 66. Protibia of *A. erythrocephala*.

Key to subfamilies, tribes, and genera of Pamphiliidae

(modified from Middlekauff, 1958; 1964; Benes 1972)

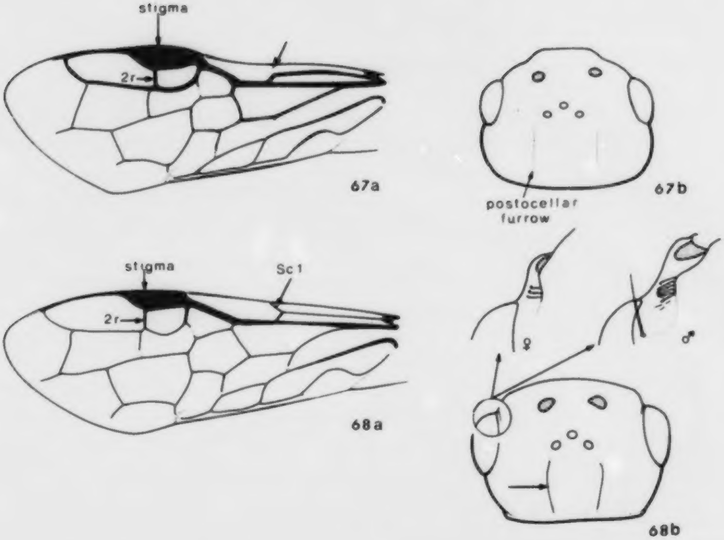
1 Tarsal claw with small inner tooth removed from apical one (Fig. 60). Membrane of fore wing irregularly wrinkled apically................................ Cephalciinae: Cephalciini 2

Tarsal claw with long inner tooth near apical one (Figs. 62, 63) or without inner tooth (not to be confused with basal lobe) (Fig. 61). Membrane of fore wing wrinkled lengthwise apically .... Pamphiliinae 4

2(1) Inner side of protibia with a preapical spur (Fig. 66). Antenna with about 30 flagellomeres .... ***Acantholyda* Costa** (p. 45) 3

Inner side of protibia without a preapical spur. Antenna with about 24 flagellomeres ...... ***Cephalcia* Panzer** (p. 45)

3(2) Head in lateral view without occipital ridge. Anal cell of hind wing in female with a short vein at apex (Fig. 65) .... ***Acantholyda (Acantholyda)* Costa** (p. 45)



Figs. 67, 68. Fore wing (*a*), dorsal view of head (*b*). 67, *Neurotoma inconspicua* (Norton); 68, *Pamphilius phyllisae* Middlekauff.

Head in lateral view with occipital ridge (Fig. 64). Anal cell of hind wing in female usually without vein at apex .... ***Acantholyda*** **(*Itycorsia*) Konow** (p. 46)

4(1) Lateral postocellar furrow weakly outlined (Fig. 67*b*). Stigma of fore wing as broad as length of vein 2r (Fig. 67*a*). Vein Sc_1 of fore wing absent (Fig. 67*a*) .... Neurotomini: ***Neurotoma*** **Konow** (p. 47)

Lateral postocellar furrow sharply outlined (Fig. 68*b*). Stigma of fore wing narrower than length of vein 2r (Fig. 68*a*). Vein Sc_1 of fore wing developed (Fig. 68*a*) .... Pamphiliini 5

5(4) Malar space without distinct concave area, at most with straight slender setae. Either cell C of fore wing without setae or cell R with setae .... ***Pamphilius*** **Latreille** (p. 47)

Malar space with distinct concave area: in female with a few hook-like setae near dorsal surface (Fig. 68*b*), in male with 1 long and stout seta and some hook-like setae. Cell C of fore wing with numerous setae, second cell R almost without setae .... ***Onycholyda*** **Takeuchi** (p. 48)

Clé des sous-familles, des tribus et des genres de Pamphiliidae

(modifiée de Middlekauff, 1958; 1964; Benes 1972)

1 Griffe du tarse pourvue d'une petite dent interne éloignée de la dent apicale (fig. 60). Membrane de l'aile antérieure irrégulièrement ridée dans la région apicale .... Cephalciinae : Cephalciini 2

Griffe du tarse pourvue d'une longue dent interne près de la dent apicale (fig. 62 ,63) ou sans dent interne (ne pas confondre avec le lobe basal) (fig. 61). Membrane de l'aile antérieure ridée longitudinalement dans la région apicale .... Pamphiliinae 4

2(1) Face interne du protibia pourvue d'un éperon préapical (fig. 66). Antenne comportant environ 30 articles .... ***Acantholyda*** **Costa** (p. 45) 3

Face interne du protibia sans éperon préapical. Antenne comportant environ 24 articles .... ***Cephalcia*** **Panzer** (p. 45)

3(2) En vue latérale, tête sans carène occipitale. Cellule anale de l'aile postérieure de la femelle pourvue d'une courte nervure à l'apex (fig. 65) .... ***Acantholyda*** **(*Acantholyda*) Costa** (p. 45)

En vue latérale, tête pourvue d'une carène occipitale (fig. 64). Cellule anale de l'aile postérieure de la femelle généralement sans nervure à l'apex .... ***Acantholyda*** **(*Itycorsia*) Konow** (p. 46)

4(1) Sillon postocellaire latéral faiblement défini (fig. 67*b*). Stigma de l'aile antérieure d'une largeur égale à la longueur de la nervure 2r (fig. 67*a*). Nervure Sc_1 de l'aile antérieure absente (fig. 67*a*) .... Neurotomini : ***Neurotoma*** **Konow** (p. 47)

Sillon postocellaire latéral nettement défini (fig. 68*b*). Stigma de l'aile antérieure plus étroit que la longueur de la nervure 2r (fig. 68*a*). Nervure Sc_1 de l'aile antérieure présente (fig. 68*a*) .... Pamphiliini 5

5(4) Surface malaire sans région concave distincte, portant tout au plus de fines soies dressées. Cellule C de l'aile antérieure sans soies ou cellule R pourvue de soies .... ***Pamphilius*** **Latreille** (p. 47)

Surface malaire présentant une région concave distincte : pourvue, chez la femelle, de quelques soies en forme de crochet près de la surface dorsale (fig. 68*b*) et, chez le mâle, d'une soie unique, longue et forte, ainsi que de soies en forme de crochet. Cellule C de l'aile antérieure pourvue de nombreuses soies, deuxième cellule R presque dépourvue de soies .... ***Onycholyda*** **Takeuchi** (p. 48)

Subfamily Cephalciinae

Diagnosis. Adults of Cephalciinae are distinguished from those of Pamphiliinae by the inner tooth of the tarsal claw, which is far from the one at the apex, and by the irregularly wrinkled membrane of the fore wing toward the apex.

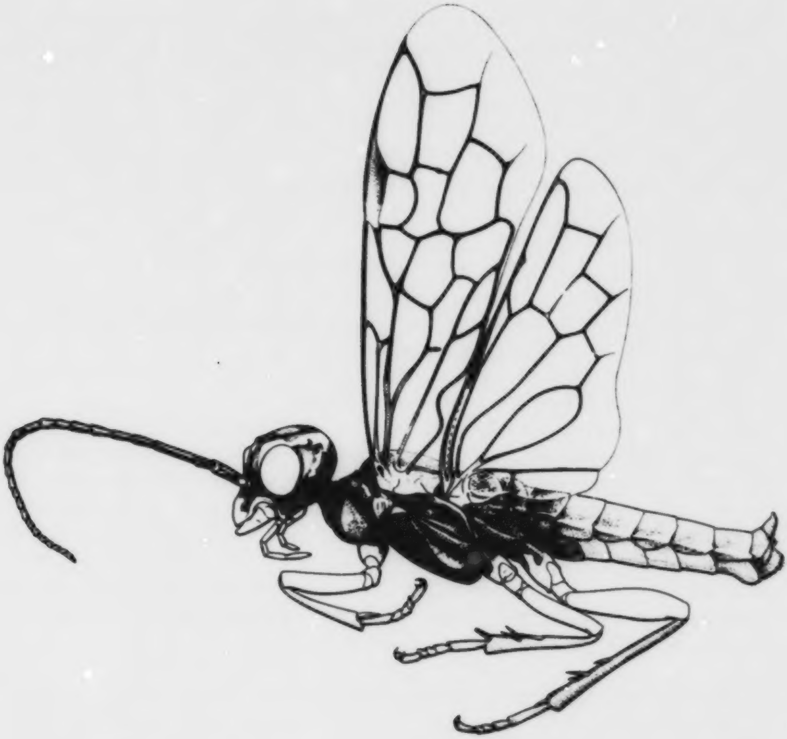
Diversity. The subfamily consists of two tribes, three genera, and over 80 species (Benson 1945*b*). The subfamily's range extends over temperate and boreal regions of Eurasia and North America (Benson 1945*b*). In North America one tribe, two genera, and 44 species are known (Smith 1979*a*). In Canada one tribe, two genera, and 29 species are recorded, but 32 species are expected. Most species are found in forested temperate regions and are most diverse in eastern Canada.

Host. Larvae of each species are usually reported from more than one genus of trees. Larvae have been reared usually from various species of pine, fir, and spruce, rarely from Douglas fir and hemlock (Smith 1979*a*).

Tribe Cephalciini

Diagnosis. See Cephalciinae.

Diversity. Cephalciini consists of two genera and over 70 species (Benson 1945*b*, Middlekauff 1958). The tribe's range extends over temperate regions of Eurasia and North America (Benson 1945*b*). For its range in North America, including Canada, see Cephalciinae.



Pamphiliidae: *Pamphilius*

Genus *Cephalcia* Panzer

Diagnosis. Adults of *Cephalcia* are distinguished from those of *Acantholyda* by the absence of a preapical spur on the protibia.

Diversity. The genus consists of more than 30 species (Benson 1945*b*; Middlekauff 1958). The range of the genus extends over forested temperate regions of Eurasia and North America (Benson 1945*b*). In North America 10 species are known, most of which occur in the East (Smith 1979*a*). In Canada nine species are recorded.

Host. Larvae feed usually on one genus of conifers. They are recorded in pine, fir, spruce, and hemlock (Smith 1979*a*).

Comments. Middlekauff (1958) revised the North American species. Eidt (1969) wrote an excellent paper on the life history of many North American species and revised Middlekauff's key.

Genus *Acantholyda* Costa

Diagnosis. Adults of the genus *Acantholyda* are distinguished from those of *Cephalcia* and other Pamphiliidae by the presence of a preapical spur on the protibia.

Diversity. The genus consists of more than 50 species (Benson 1945*b*; Middlekauff 1958) and occurs in forested regions of Eurasia and North America (Benson 1945*b*). In North America 34 species are known (Smith 1979). In Canada 20 species are recorded, but 23 are expected. The range of most species is in temperate regions of Canada, but that of some species extends into boreal regions.

Host. Larvae feed mainly on various species of pine, though larvae are known to feed on various species of spruce and fir, particularly on Douglas fir, and on hemlock (Smith 1979*a*).

Comments. Middlekauff (1958) revised the North American species of the genus.

Subgenus *Acantholyda* Costa

Diagnosis. Adults of the subgenus *Acantholyda* are distinguished from those of *Itycorsia* by the presence of a ridge on the postocular area of the head in lateral view.

Diversity. The subgenus is known in Eurasia and North America. In North America eight species are known (Smith 1979*a*). In Canada four species are recorded, but six are expected.

Host. Larvae feed only on various species of pine (Smith 1979*a*).

Subgenus *Itycorsia* Konow

Diagnosis. Adults of *Itycorsia* are distinguished from those of the subgenus *Acantholyda* by the absence of a ridge on the postocular area of the head in lateral view.

Diversity. The subgenus is known in Eurasia and North America, south into Mexico. In North America 26 species are known (Smith 1979*a*). In Canada 16 species are recorded, but 17 are expected.

Host. See genus *Acantholyda*.

Subfamily Pamphiliinae

Diagnosis. Adults of Pamphiliinae are distinguished from those of the Cephalciinae by the preapical tooth of the tarsal claw, which is close to the apical one, or by the absence of the preapical tooth on the tarsal claw.

Diversity. The subfamily consists of two tribes, three genera, and more than 95 species (Benson 1945*b*; Middlekauff 1964). The range of the subfamily extends over temperate and boreal forested regions of Eurasia and North America (Benson 1945*b*). In North America 29 species are known (Smith 1979*a*). In Canada 25 species are recorded, but 28 are expected. Most species have ranges in the temperate regions of Canada, and a few occur in boreal regions.

Host. Larvae feed only on deciduous woody bushes and small trees (Benson 1952; Smith 1979*a*).

Tribe Neurotomini

Diagnosis. Adults of Neurotomini are distinguished from those of Pamphiliini by the weakly outlined postocellar furrows and by the absence of Sc_1.

Diversity. The tribe consists of one genus and about 10 species (Benson 1945*b*). The tribe's range extends over forested temperate regions of Eurasia and North America (Benson 1945*b*).

Host. The larvae feed on various rosaceous woody genera (their only hosts in North America) and on oak (Benson 1945*b*).

Genus *Neurotoma* Konow

Diagnosis. See Neurotomini.

Diversity. In North America, including Canada, four species of *Neurotoma* are known (Middlekauff 1958).

Host. Larvae feed on leaves of plum, cherry, and hawthorn (Smith 1979*a*).

Comments. Middlekauff (1958, 1988) revised the North American species of the genus.

Tribe Pamphiliini

Diagnosis. Adults of Pamphiliini are distinguished from those of Neurotomini by the deeply outlined postocellar furrows and by the presence of Sc_1.

Diversity. The tribe consists of two genera with more than 85 species (Benson 1945*b*; Middlekauff 1964; Benes 1972). The tribe's range extends throughout temperate and boreal forested regions of Eurasia and North America (Benson 1945*b*).

Host. Larvae feed on leaves of several species of cherry, serviceberry, raspberry, and related plants, on apple, peach, beaked hazelnut, beech, poplar, and arrowwood (Smith 1979*a*).

Genus *Pamphilius* Latreille

Diagnosis. Adults of *Pamphilius* are distinguished from those of *Onycholyda* by the absence of hook-like setae in the malar area.

Diversity. The genus consists of about 45 species found in Eurasia and North America (Benes 1972; Middlekauff 1964, Smith 1979*a*; Shinohara and Smith 1983). In North America 17 species are known. In Canada 14 species are recorded but 16 are expected.

Host. See Pamphiliini.

Comments. Middlekauff (1964) revised the North American species of the genus.

Genus *Onycholyda* Takeuchi

Diagnosis. Adults of *Onycholyda* are distinguished from those of *Pamphilius* by presence of some hook-like setae in the malar area.

Diversity. The genus consists of at least 20 species found in Eurasia and North America. In North America 17 species are known (Smith 1979*a*; Benes 1972). In Canada seven species are recorded but eight are expected.

Comments. Middlekauff (1964) revised the North American species of the genus under couplets 3–9 and 10–23.

Superfamily Tenthredinoidea

Diagnosis. Adults of Tenthredinoidea are distinguished from those of other superfamilies by the markedly narrow pronotum medially, by the presence of 2 spurs at the apex of the protibia, and by the absence of a transscutal articulation on the mesonotum.

Diversity. The superfamily consists of six families, 37 subfamilies, about 400 genera, and over 7000 species found around the world except for most oceanic islands and Antarctica (Benson 1938, 1952, 1958; Smith 1974*a*, 1978, 1979*a*). In North America five families, 15 subfamilies, 119 genera, and over 900 species are known (Smith 1979*a*). In Canada five families, 15 subfamilies, 102 genera, and over 600 species are recorded, but over 700 species are expected.

Host. Larvae feed on leaf tissue of ferns, horsetails, angiosperms, and gymnosperms and very rarely in the piths of twigs or catkins (Benson 1950, 1952, 1958; Smith 1979*a*).

FAMILY PERGIDAE

Diagnosis. Adults of Pergidae are distinguished from tenthredinoid families, which have tergum 1 fused to the metapleurum, by the absence of vein 2r in the fore wing, by the absence of the anal cell in the hind wing, and by the presence of 3 or more flagellomeres.

Diversity. The family consists of 14 subfamilies, 53 genera, and more than 350 species (Smith 1978). The family is known in Australia, New Guinea, and Central, South, and North America and is especially diverse in Australia and South America (Smith 1978; Nauman 1984). In North America one subfamily, one genus, and about four species are known (Smith 1979*a*). In Canada one subfamily, one genus, and three species are recorded, but four species are expected.

Subfamily Acordulecerinae

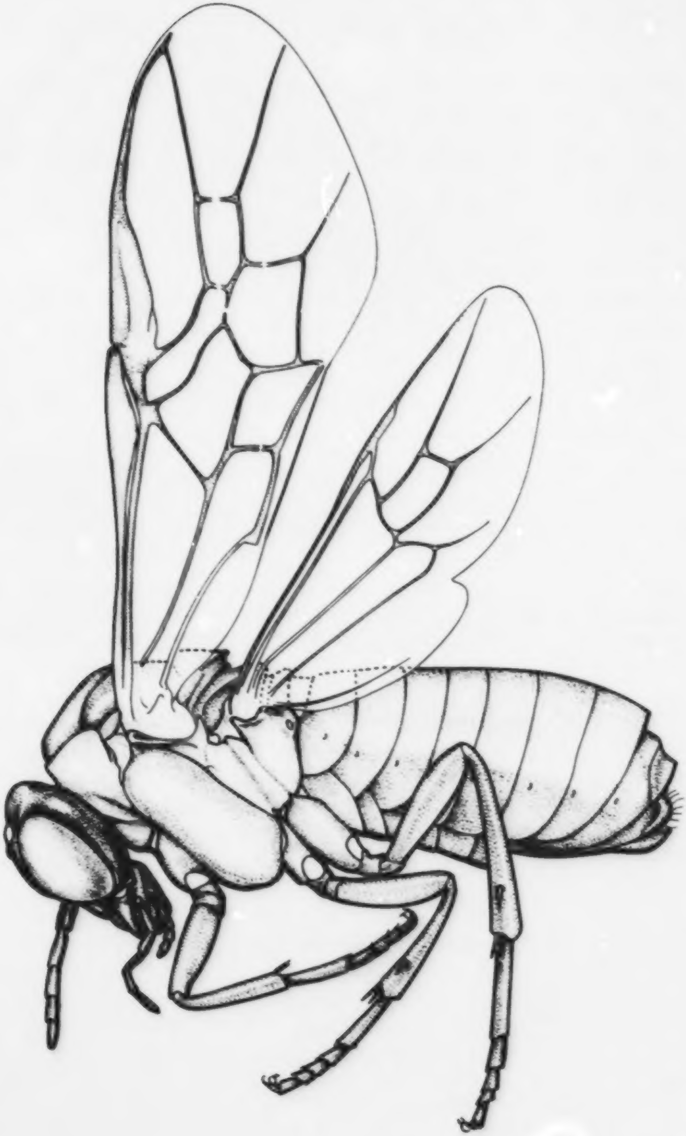
Diagnosis. Adults of Acordulecerinae are distinguished from those of other subfamilies by the presence of 2 preapical spurs on the metatibia, by a ridge between the dorsal surface and the lateral margins of the metascutellum, and by 4 or 5 flagellomeres.

Diversity. The subfamily consists of three genera and 55 or more species (Smith 1978). The subfamily's range extends over South, Central, and North America (Smith 1978). In North America one genus and four species are known (Smith 1979*a*). In Canada one genus and three species are recorded, but four species are expected.

Genus *Acordulecera* Say

Diagnosis. *Acordulecera* is distinguished from all other North American Symphyta by its small size (3–6 mm) and by the flagellum with 4 flagellomeres.

Diversity. The genus consists of more than 50 described species, found in South, Central, and North America (Smith 1978). In North America four species are listed (Smith 1979*a*). In Canada three species are recorded, but four are expected. The genus is restricted to temperate and warmer regions of eastern North America (Smith 1979*a*).



Pergidae: *Acordulecera*

Host. Larvae of North American species feed on leaves of oak, hickory, walnut, and buckeye (Smith 1979*a*).

Comments. The genus is indeed larger than expected and is in need of study in North America.

FAMILY ARGIDAE

Diagnosis. Adults of Argidae are distinguished from those of other families of Symphyta by the one-jointed flagellum and by the metapleuron fused with the tergum 1.

Diversity. The family consists of 10 subfamilies, seven tribes, 46 genera, and over 800 species (Benson 1938). The family's range extends over the major land masses of the world except for Antarctica and New Zealand (Benson 1938). In North America three subfamilies, eight genera, and 60 species are known (Smith 1969*d*, 1979*a*, 1989). In Canada three subfamilies, five genera, and 25 species are recorded, but six genera and 35 species are expected.

Key to subfamilies, genera, and subgenera of Argidae

(modified from Smith 1969*d*)

1 Cell R_1 of hind wing closed at apex (Fig. 69). Mesotibia and metatibia with a preapical spur (Fig. 72). Flagellum in male simple .... Arginae: ***Arge*** **Schrank** (p. 55)

Cell R_1 of hind wing open apically (Fig. 70). Mesotibia and metatibia without a preapical spur. Flagellum in male simple or fork-like (Fig. 73) 2

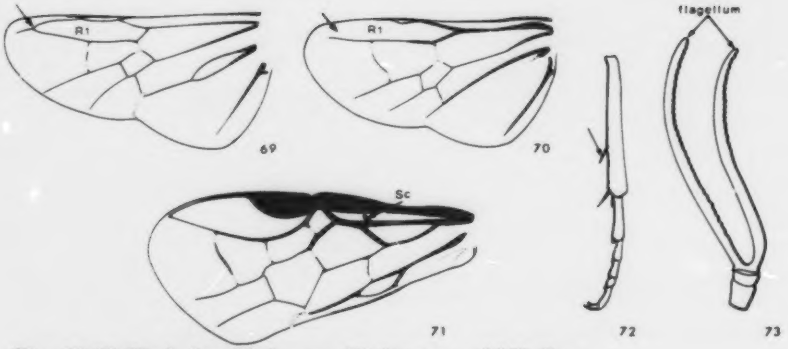
2(1) Vein Sc of fore wing developed (Fig. 71). Flagellomere 1 in male simple. Claw with base lobed .... Atomacerinae: ***Atomacera*** **Say** (p. 57)

Vein Sc of fore wing absent. Flagellomere 1 in male fork-like (Fig. 73). Claw simple, not lobed at base .... Sterictiphorinae 3

3(2) Anal cell of hind wing absent (Fig. 74) .... ***Schizocerella*** **Forsius** (p. 58)

Anal cell of hind wing present (Fig. 75) 4

4(3) Head in dorsal view concave between eyes (Fig. 77). Fore wing without basal anal cell ***Aprosthema*** **Konow** (p. 58)

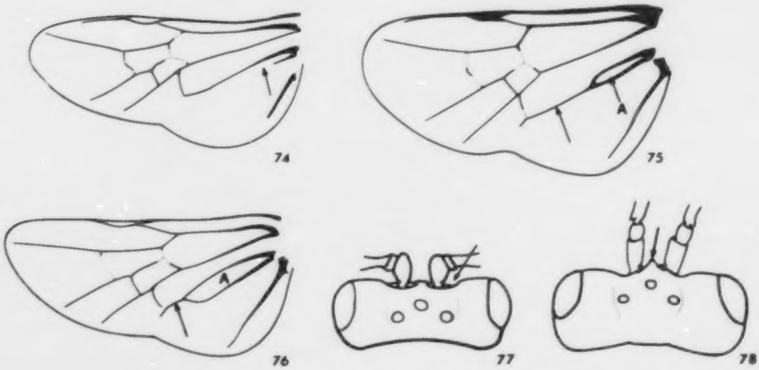


Figs. 69, 70. Hind wing. 69, *Arge* sp.; 70, *Atomacera debilis* Say.
Fig. 71. Fore wing of *A. debilis*.
Fig. 72. Metatibia of *Arge* sp.
Fig. 73. Antenna of male of *Sphacophilus cellularis* (Say).

Head in dorsal view convex between eyes and with ridge between antennal sockets (Fig. 78). Fore wing with basal anal cell 5

5(4) Vein at apex of anal cell of hind wing longer than length of anal cell (Fig. 75) .... ***Sphacophilus* Provancher** 6

Vein at apex of anal cell of hind wing much shorter than length of anal cell (Fig. 76) .... ***Sterictiphora* Billberg** (p. 58)



Figs. 74–76. Hind wing. 74, *Schizocerella pilicornis* (Holmgren); 75, *Sphacophilus cellularis* (Say); 76, *Sterictiphora cruenta* Smith.
Figs. 77, 78. Dorsal view of head. 77, *Aprosthema brunniventre* (Cresson); 78, *S. cellularis*.

6(5) Valvula 3 in lateral view simple and blade-like (Fig. 79*a*) and in dorsal view lateral margins regularly converging toward apex (Fig. 79*b*). Harpes in male with ridge on inner surface (Fig. 79*c*) .... ***Sphacophilus* (*Litocolus*) Smith** (p. 59)

Valvula 3 in lateral view with small to large lobes near apex (Figs. 80a, 81*a*) and in dorsal view lateral margins not regularly converging toward apex because of protruding lateral lobes (Figs. 80*b*, 81*b*). Harpes in male without ridge on inner surface (Figs. 80*c*, 81*c*) 7

7(6) Lateral lobe near apex of valvula 3 in lateral view narrow and almost cylindrical (Fig. 80*a*). Harpes in male wider than long (Fig. 80*c*). Penis valve in male without lateral spine. Body black .... ***Sphacophilus* (*Sphacophilus*) Provancher** (p. 59)

Lateral lobe near apex of valvula 3 in lateral view broad and round (Fig. 81*a*). Harpes in male as long as or longer than wide (Fig. 81*c*). Penis valve in male with lateral spine. Body in part reddish brown .... ***Sphacophilus* (*Ceocolus*) Smith** (p. 60)

Clé des sous-familles, des genres et des sous-genres d'Argidae

(modifiée de Smith 1969*d*)

1 Cellule R_1 de l'aile postérieure fermée à l'apex (fig. 69). Mésotibia et métatibia pourvus d'un éperon préapical (fig. 72). Flagelle simple chez le mâle .... Arginae : ***Arge* Schrank** (p. 55)

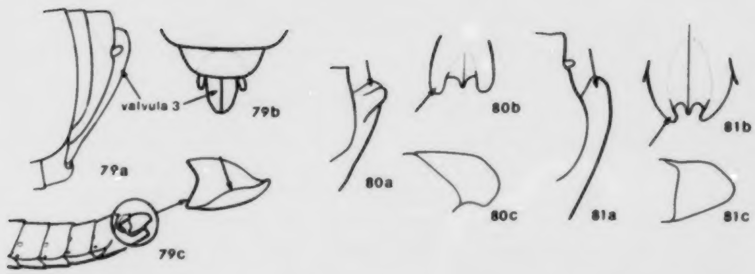
Cellule R_1 de l'aile postérieure ouverte à l'apex (fig. 70). Mésotibia et métatibia sans éperon préapical. Flagelle du mâle simple ou en forme de fourche (fig. 73) 2

2(1) Nervure Sc de l'aile antérieure présente (fig. 71). Article 1 du flagelle simple chez le mâle. Griffe munie d'un lobe basal .... Atomacerinae : ***Atomacera* Say** (p. 57)

Nervure Sc de l'aile antérieure absente. Article 1 du flagelle en forme de fourche chez le mâle (fig. 73). Griffe simple, non munie d'un lobe basal ... Sterictiphorinae 3

3(2) Cellule anale de l'aile postérieure absente (fig. 74) .... ***Schizocerella* Forsius** (p. 58)

Cellule anale de l'aile postérieure présente (fig. 75) 4



Figs. 79–81. Genitalia: (*a*) valvula 3 in lateral view, (*b*) valvula 3 in dorsal view, (*c*) harpes. 79, *Sphacophilus (Litocolus) cellularis* (Say) (harpes, inner view); 80, *Sphacophilus (Sphacophilus) invitus* (Cresson) (harpes, outer view); 81, *Sphacophilus (Ceocolus) nigriceps* (Konow) (harpes, outer view).

4(3) En vue dorsale, tête concave entre les yeux (fig. 77). Absence de cellule anale basale dans l'aile antérieure .... ***Aprosthema*** **Konow** (p. 58)

En vue dorsale, tête convexe entre les yeux et pourvue d'une carène entre les cavités antennaires (fig. 78). Présence d'une cellule anale basale dans l'aile antérieure 5

5(4) Nervure à l'apex de la cellule anale de l'aile postérieure plus longue que la cellule anale (fig. 75) .... ***Sphacophilus*** **Provancher** 6

Nervure à l'apex de la cellule anale de l'aile postérieure beaucoup plus courte que la cellule anale (fig. 76) .... ***Sterictiphora*** **Billberg** (p. 58)

6(5) En vue latérale, valvule 3 simple et en forme de lame (fig. 79*a*) et, en vue dorsale, bords latéraux convergeant régulièrement vers l'apex (fig. 79*b*). Harpes du mâle pourvues d'une carène sur la face intérieure (fig. 79*c*) .... ***Sphacophilus*** **(*Litocolus*) Smith** (p. 59)

En vue latérale, valvule 3 pourvue, près de l'apex, de lobes dont la taille varie de petits à grands (fig. 80*a*, 81*a*) et, en vue dorsale, bords latéraux ne convergeant pas régulièrement vers l'apex à cause des lobes latéraux saillants (fig. 80*b*, 81*b*). Harpes du mâle sans carène sur la face intérieure (fig. 80*c*, 81*c*) 7

7(6) En vue latérale, lobe latéral près de l'apex de la valvule 3 étroit et presque cylindrique (fig. 80*a*). Harpes du mâle plus larges que longues (fig. 80*c*). Chez le mâle, valve du pénis sans épine latérale. Corps noir .... ***Sphacophilus* (*Sphacophilus*) Provancher** (p. 59)

En vue latérale, lobe latéral près de l'apex de la valvule 3 large et arrondi (fig. 81*a*). Harpes du mâle aussi longues ou plus longues que larges (fig. 81*c*). Chez le mâle, valve du pénis pourvue d'une épine latérale. Corps en partie brun rougeâtre .. ***Sphacophilus* (*Ceocolus*) Smith** (p. 60)

Subfamily Arginae

Diagnosis. Adults of Arginae are distinguished from those of other subfamilies by the presence of the following: a preapical spur on the mesotibia and metatibia, the vein Sc_1 on fore wing, a simple male flagellum, and a closed R cell in the hind wing.

Diversity. The subfamily consists of five genera (Benson 1938) and ranges over the major land masses of the world except Antarctica (Benson 1938). In North America, including Canada, one genus is known (Smith 1969*d*, 1979*a*).

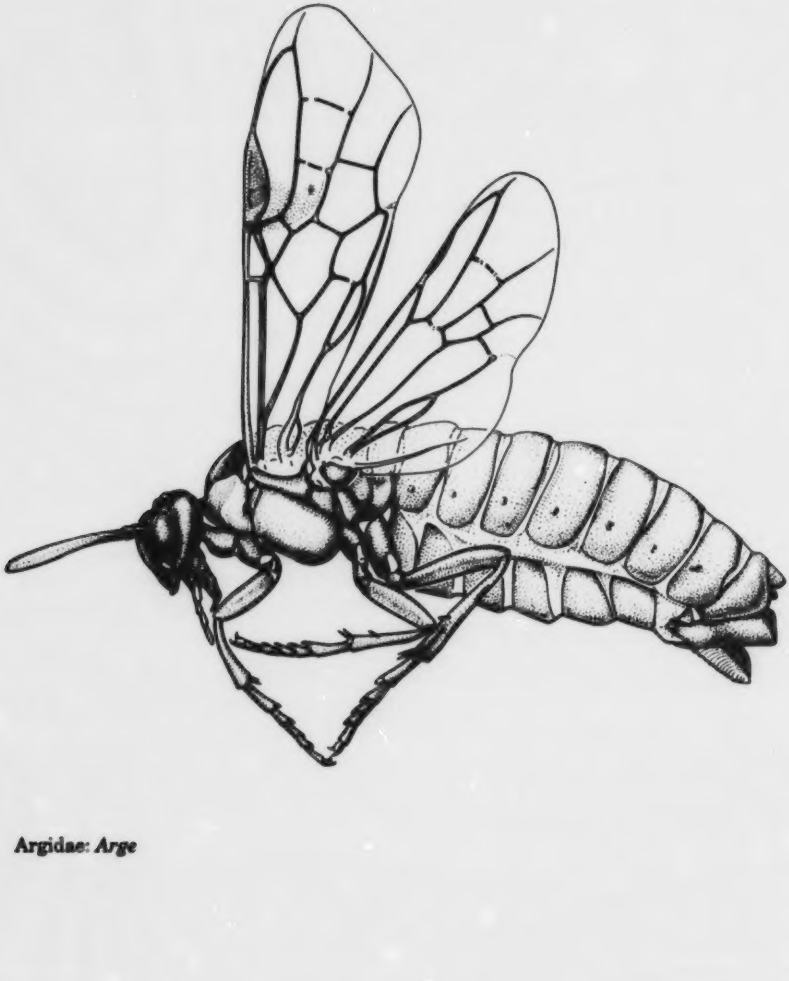
Genus *Arge* Shrank

Diagnosis. Adults of *Arge* are distinguished from those of other North American genera by the presence of a preapical spur on the mesotibia and metatibia.

Diversity. The genus consists of over 200 species known in Eurasia, North America, and Africa (Benson 1938). In North America 26 species are known (Smith 1989). In Canada 19 species are recorded. The genus is reported in temperate and boreal regions, but it is most diverse in eastern North America.

Host. Larvae feed on leaves of serviceberry, poplar, basswood, pear, mountain-ash, azalea, birch, ironwood, hornbeam, hazelnut, hawthorn, cherry, willow, poison ivy and related species, rose, alder, oak, and elm (Smith 1979*a*).

Comments. D.R. Smith revised the North American species of the genus (1989).



Argidae: ***Arge***

Subfamily Atomacerinae

Diagnosis. Adults of Atomacerinae are distinguished from those of other North American subfamilies by the absence of a preapical spur on the mesotibia and metatibia and by the presence of the following: vein Sc_1 on the fore wing, a large basal lobe on tarsal claws, a simple male flagellum, and an open R cell in the hind wing.

Diversity. The subfamily consists of one genus known from temperate and tropical regions of South, Central, and North America (Benson 1938). In North America the genus is recorded in eastern regions (Smith 1979*a*).

Genus *Atomacera* Say

Diagnosis. See Atomacerinae.

Diversity. *Atomacera* consists of 18 species (Smith 1969*d*). In North America three species are known (Smith 1979*a*). In Canada one species is recorded, but two are expected.

Host. Larvae feed on *Desmodium*, Leguminosae, and *Hibiscus* (Smith 1979*a*).

Comments. Smith (1969*d*) revised the North American species of the genus.

Subfamily Sterictiphorinae

Diagnosis. Adults of Sterictiphorinae are distinguished from those of other North American subfamilies of Argidae by the absence of the following: a preapical spur on the mesotibia and metatibia, vein Sc_1 in the fore wing, a forked flagellum in males, an open R cell in the hind wing, simple tarsal claws, and the usually markedly swollen apex of vein C.

Diversity. The subfamily consists of 25 genera (Benson 1938). In North America one tribe, six genera, and 46 species are known (Smith 1979*a*). In Canada one tribe, three genera, and seven species are recorded, but four genera and 14 species are expected.

Genus *Sterictiphora* Billberg

Diagnosis. Adults of *Sterictiphora* are distinguished from other North American genera of the family by the developed anal cell of the hind wing, by the generally convex anterior margin of the head in dorsal view, and by the anal cell of the hind wing, which is much longer than the vein at its apex.

Diversity. The genus consists of 14 species recorded in Eurasia, Africa, and North America (Smith 1969*d*). In North America six species are known (Smith 1979*a*). In Canada two species are recorded but five are expected.

Host. Larvae feed on cherry and serviceberry (Smith 1979*a*).

Comments. Smith (1969*d*) revised the North American species of the genus.

Genus *Aprosthema* Konow

Diagnosis. Adults of *Aprosthema* are distinguished from those of other North American genera of the tribe by the presence of an anal cell in the hind wing, by the absence of a basal anal cell in the fore wing, and by the generally concave outline of the anterior margin of the head in dorsal view.

Diversity. The genus consists of 10 species recorded in Eurasia and western North America (Smith 1971*b*). In North America two species are recorded (Smith 1979*a*). In Canada one is expected.

Host. *Hosackia* (Smith 1979*a*).

Comments. Smith (1971*b*) revised the North American species of the genus.

Genus *Schizocerella* Forsius

Diagnosis. Adults of *Schizocerella* are distinguished from those of other North American genera of the family by the open radial cell of the fore wing.

Diversity. The genus consists of several New World species. *Schizocerella pilicornis* (Holmgren) is the most widespread and was accidentally introduced into Australia (Smith 1971*b*).

Host. The larvae are leaf miners of *Portulaca*, a weed (Smith 1979*a*).

Comments. Smith (1971*b*) revised the North American species of the genus.

Genus *Sphacophilus* Provancher

Diagnosis. Adults of *Sphacophilus* are distinguished from those of other North American genera of the family by the open radial cell of the fore wing, by the presence of an anal cell in the hind wing, by the generally convex outline of the anterior margin of the head in dorsal view, and by the anal cell of the hind wing, which is shorter than the vein at its apex.

Diversity. The genus consists of three subgenera and over 22 species in North America (Smith 1971*b*). In Canada two species are recorded, but seven are expected.

Host. Larvae feed on leaves of Convolvulaceae and Leguminosae (Smith 1979*a*).

Comments. Smith (1971*b*) revised the North American species of the genus.

Subgenus *Sphacophilus* Provancher

Diagnosis. Adults of *Sphacophilus* are distinguished from those of other subgenera by the combination of characters in the key.

Diversity. The subgenus consists of two species in western North America (Smith 1979*a*). In Canada no species are recorded but two are expected.

Comments. See genus *Sphacophilus*.

Subgenus *Litocolus* Smith

Diagnosis. Adults of *Litocolus* are distinguished from those of other subgenera by the combination of characters in the key.

Diversity. The subgenus consists of six species in North America (Smith 1979*a*). In Canada only *S. cellularis* (Say) is recorded in eastern regions.

Host. Larvae feed on leaves of Convolvulaceae: *Ipomea* and *Convolvulus* (Smith 1979*a*).

Comments. See genus *Sphacophilus*.

Subgenus *Ceocolus* Smith

Diagnosis. Adults of *Ceocolus* are distinguished from those of other subgenera by the combination of characters in the key.

Diversity. The genus consists of 14 species in North America (Smith 1979*a*). In Canada one species is recorded, but five are expected.

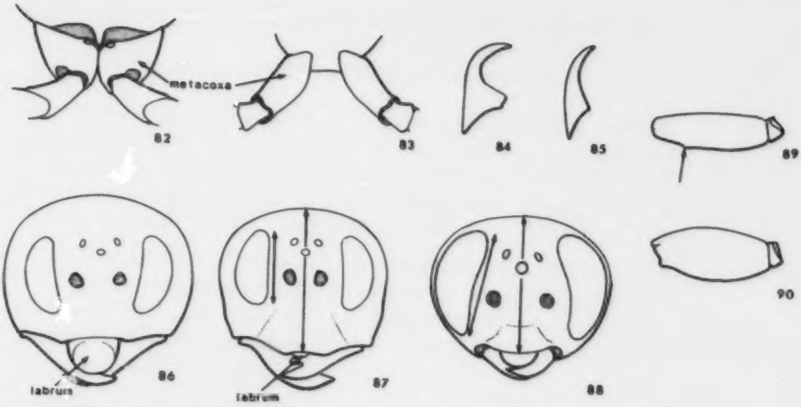
Host. Larvae feed on leaves of Leguminosae: *Psoralea*, *Desmodium*, and *Petalostemum* (Smith 1979*a*).

Comments. See genus *Sphacophilus*.

FAMILY CIMBICIDAE

Diagnosis. Adults of Cimbicidae are distinguished from those of other families of Symphyta by the club-like antenna and by the folded terga above the spiracle.

Diversity. The family consists of four subfamilies, two tribes, 19 genera, and over 130 species (Benson 1938). The family's range extends over Eurasia and South and North America (Benson 1938, Smith 1988*a*). In North America two subfamilies, two tribes, three genera, and nine species are known (Smith 1979*a*). In Canada two subfamilies, two tribes, three genera, and five species are recorded, but six species are expected. Adults of the family are recorded in temperate and boreal regions of North America (Smith 1979*a*).



Figs. 82, 83. Mesocoxae. 82, *Zaraea americana* Cresson; 83, *Cimbex americana* Leach.
Figs. 84, 85. Tarsal claw. 84, *C. americana*; 85, *Z. americana*.
Figs. 86, 87. Frontal view of head. 86, *Trichiosoma triangulum* Kirby; 87, *C. americana*.
Fig. 88. Head of *C. americana*.
Figs. 89, 90. Lateral view of metafemur. 89, *T. triangulum*; 90, *C. americana*.

Key to subfamilies and genera of Cimbicidae

(mainly from Benson 1952 and Ross 1937)

1 Length of eye about 0.67 of medial length of head (including clypeus) in frontal view (Fig. 88). Metacoxae touching at base (Fig. 82). Tarsal claw not swollen at base (Fig. 85). Body length 12 mm or less .... Abiinae: ***Zaraea* Leach** (p. 62)

Length of eye half the medial length of head (including clypeus) in frontal view (Fig. 87). Metacoxae clearly separated at base (Fig. 83). Tarsal claw enlarged at base (Fig. 84). Body length 12 mm or more .... Cimbicinae 2

2(1) Setae dense over body and as long as greatest width of metatibia. Labrum large (Fig. 86). Ventral surface of metafemur with tooth near apex (Fig. 89) .... ***Trichiosoma* Leach** (p. 64)

Setae dense on head and thorax, scattered or absent from many abdominal terga, and at most as long as half the greatest width of metatibia. Labrum small (Fig. 87). Ventral surface of metafemur without tooth (Fig. 90) .... ***Cimbex* Olivier** (p. 65)

Clé des sous-familles et des genres de Cimbicidae

(principalement tirée de Benson 1952 et de Ross 1937)

1 En vue frontale, longueur de l'oeil égale à environ 0,67 fois la longueur médiane de la tête (incluant le clypéus) (fig. 88). Métacoxae se touchant à la base (fig. 82). Base de la griffe du tarse non enflée (fig. 85). Longueur du corps : 12 mm ou moins .... Abiinae : ***Zaraea* Leach** (p. 62)

En vue frontale, longueur de l'oeil égale à la moitié de la longueur médiane de la tête (incluant le clypéus) (fig. 87). Métacoxae nettement séparés à la base (fig. 83). Base de la griffe du tarse élargie (fig. 84). Longueur du corps : 12 mm ou plus .... Cimbicinae 2

2(1) Soies denses sur le corps et aussi longues que la largeur maximale du métatibia. Labre grand (fig. 86). Surface ventrale du métafémur pourvue d'une dent près de l'apex (fig. 89) .... ***Trichiosoma* Leach** (p. 64)

Soies denses sur la tête et le thorax, dispersées ou absentes sur de nombreux terga abdominaux, et tout au plus de longueur égale à la moitié de la largeur maximale du métatibia. Labre petit (fig. 87). Surface ventrale du métafémur sans dent (fig. 90) .... ***Cimbex* Olivier** (p. 65)

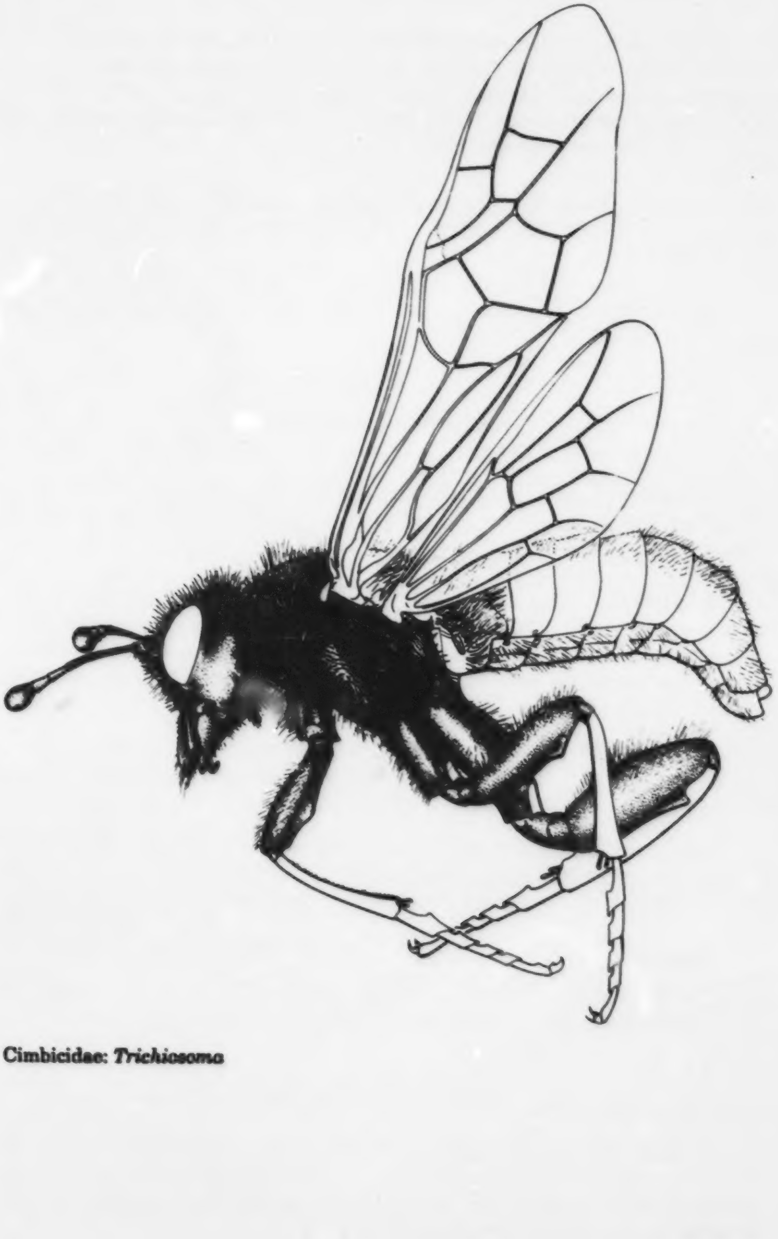
Subfamily Abiinae

Diagnosis. Adults of Abiinae are distinguished from those of other subfamilies by the anal cell of the fore wing, which is divided in two by a constriction in the middle, by the deeply outlined notauli, and by the short malar space.

Diversity. The subfamily consists of four genera (Benson 1938). The subfamily is distributed in boreal, temperate, and tropical regions of Eurasia, and in boreal and temperate regions of North America (Benson 1938; Smith 1979*a*). Eurasia is the region of the greatest diversity. In North America, including Canada, one genus is known.

Genus *Zaraea* Leach

Diagnosis. Adults of *Zaraea* are distinguished from those of other North American genera of the family by their small body size and by a constriction that divides the anal cell of the fore wing.



Cimbicidae: ***Trichiosoma***

Diversity. The genus consists of more than 25 species (Benson 1938), most of which are concentrated in temperate and boreal regions of Eurasia (Benson 1938; Smith 1979*a*). In North America four species are known (Smith 1979*c*). In Canada two species are known, but three are expected.

Host. Larvae feed on leaves of honeysuckle and *Symphoricarpos* (Benson 1952; Smith 1979*a*). I have also collected larvae from *Menyanthes*.

Comments. The North American species of the genus are in need of study.

Subfamily Cimbicinae

Diagnosis. Adults of Cimbicinae are distinguished from those of other subfamilies by the anal cell of the fore wing, which is divided in two by a crossvein.

Diversity. The subfamily consists of two tribes and eight genera (Benson 1938). The subfamily's range extends over temperate and tropical Eurasia and North America (Benson 1938). In North America and in Canada two tribes and two genera are known (Smith 1979*a*).

Tribe Trichiosomini

Diagnosis. Adults of Trichiosomini are distinguished from those of Cimbicini by the basal width of the labrum, which is equal to 0.7 or more of the apical width of the clypeus.

Diversity. The tribe consists of three genera (Benson 1938). In North America, including Canada, only *Trichiosoma* is known (Smith 1979*a*).

Genus *Trichiosoma* Leach

Diagnosis. Adults of *Trichiosoma* are distinguished from those of other North American genera by the large labrum (see Trichiosomini) and by the presence of a tooth-like projection on the ventral surface of the metafemur.

Diversity. The genus consists of 20 species (Benson 1938). In North America four species are known (Smith 1979*a*). In Canada two species are recorded, but three are expected. The range of North American species extends over temperate and boreal regions (Smith 1979*a*).

Hosts. Larvae feed on leaves of alder, birch, poplar, cherry, ash, and willow (Smith 1979*a*).

Comments. The North American species of the genus are in need of study.

Tribe Cimbicini

Diagnosis. Adults of Cimbicini are distinguished from those of Trichiosomini by the basal width of the labrum, which is less than one-quarter of the apical width of the clypeal margin.

Diversity. The tribe consists of five genera (Benson 1938). In North America, including Canada, only *Cimbex* is known (Smith 1979*a*).

Genus *Cimbex* Olivier

Diagnosis. Adults of *Cimbex* are distinguished from those of other North American genera by the very small labrum (see Cimbicini) and by the lack of a tooth-like projection on the ventral surface of the metafemur.

Diversity. The genus consists of 17 species recorded in Eurasia and North America (Benson 1938). In North America four species are known (Smith 1979*a*), and in Canada two are recorded.

Host. Larvae of North American species feed on leaves of maple, alder, birch, ironwood, poplar, cherry, willow, basswood, and elm (Smith 1979*a*).

Comments. The North American species of the genus have not been revised.

FAMILY DIPRIONIDAE

Diagnosis. Adults of Diprionidae are distinguished from those of other North American families of Symphyta by the comb-like flagellum of males and the saw-like and many jointed (about 20 flagellomeres) flagellum of females.

Diversity. The family consists of two subfamilies, 11 genera, and more than 90 species (Benson 1939, 1945*c*; Smith 1974*a*). The family's range extends mainly throughout temperate and boreal regions of Eurasia and North America, but some species extend throughout North Africa, Thailand, North India, and North America, south to Nicaragua and Cuba (Smith 1974*a*, 1988*a*). In North America two subfamilies, six genera, and 42 species are known (Smith 1979*a*). In Canada two subfamilies, four genera, and 19 species are recorded, but 24 species are expected.

Host. Larvae feed on leaves of coniferous trees (Smith 1974*a*).

Key to subfamilies and genera of Diprionidae

(mainly from Smith 1974*a*)

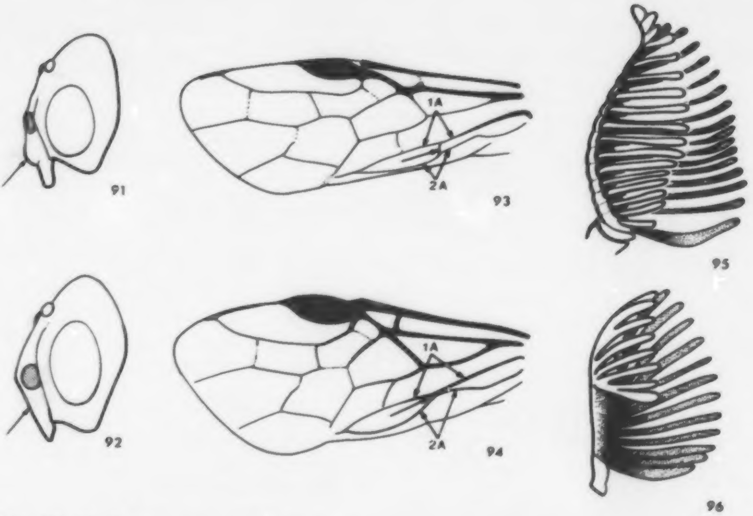
1 Vein 2A of fore wing fused to 1A near middle (Fig. 94). Each flagellomere in male with 1 comb-like projection (Fig. 96). Middle surface between clypeus and antennal socket convex (Fig. 91) .... Monocteninae: ***Monoctenus* Hartig** (p. 70)

Vein 2A of fore wing not fused to 1A, but joined to it by crossvein (Fig. 93). Each flagellomere in male with 2 comb-like projections (Fig. 95). Middle surface between clypeus and antennal socket flat (Fig. 92) .... Diprioninae 2

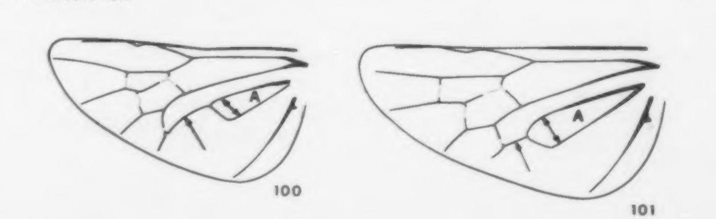
2(1) Cenchrus small: maximum width about half the distance between cenchri (Fig. 97). Metascutellum large: medial length longer than width of cenchrus (Fig. 97) .... ***Diprion* Shrank** (p. 71)

Cenchrus large: maximum width larger than the distance between cenchri (Fig. 98). Metascutellum small: medial length shorter than width of cenchrus (Fig. 98) 3

3(2) Medial angle of anterior margin of mesoscutellum obtuse (Fig. 98). Vein at apex of anal cell of hind wing much longer than cell width (Fig. 100) .... ***Gilpinia* Benson** (p. 72)


91
1A
2A
93
95
92
1A
2A
94
96

Figs. 91, 92. Lateral view of head. 91, *Monoctenus fulvus* (Norton); 92, *Neodiprion nannulus* Schedl.
Figs. 93, 94. Fore wing. 93, *M. fulvus*; 94, *N. lecontei* (Fitch).
Figs. 95, 96. Antenna of male. 95, *N. lecontei*; 96, *M. fulvus*.


cenchrus
metascutellum
97
mesoscutellum
98
99
A
100
A
101

Figs. 97–99. Mesoscutellum and metanotum. 97, *Gilpinia frutetorum* (Fabricius); 98, *Diprion similis* (Hartig); 99, *Neodiprion nannulus* Schedl.
Figs. 100, 101. Hind wing. 100, *G. frutetorum*; 101, *N. nannulus*.

Medial angle of anterior margin of mesoscutellum about square (Fig. 99). Vein at apex of anal cell of hind wing about as long as cell width (Fig. 101)............................... .... ***Neodiprion* Rohwer** (p. 71)

Clé des sous-familles et des genres de Diprionidae

(principalement tirée de Smith 1974*a*)

1 Nervure 2A de l'aile antérieure fusionnée à la nervure 1A près du centre (fig. 94). Chez le mâle, chaque article du flagelle pourvu d'une projection pectinée (fig. 96). Surface centrale entre le clypéus et la cavité antennaire convexe (fig. 91) .... Monocteninae : ***Monoctenus* Hartig** (p. 70)

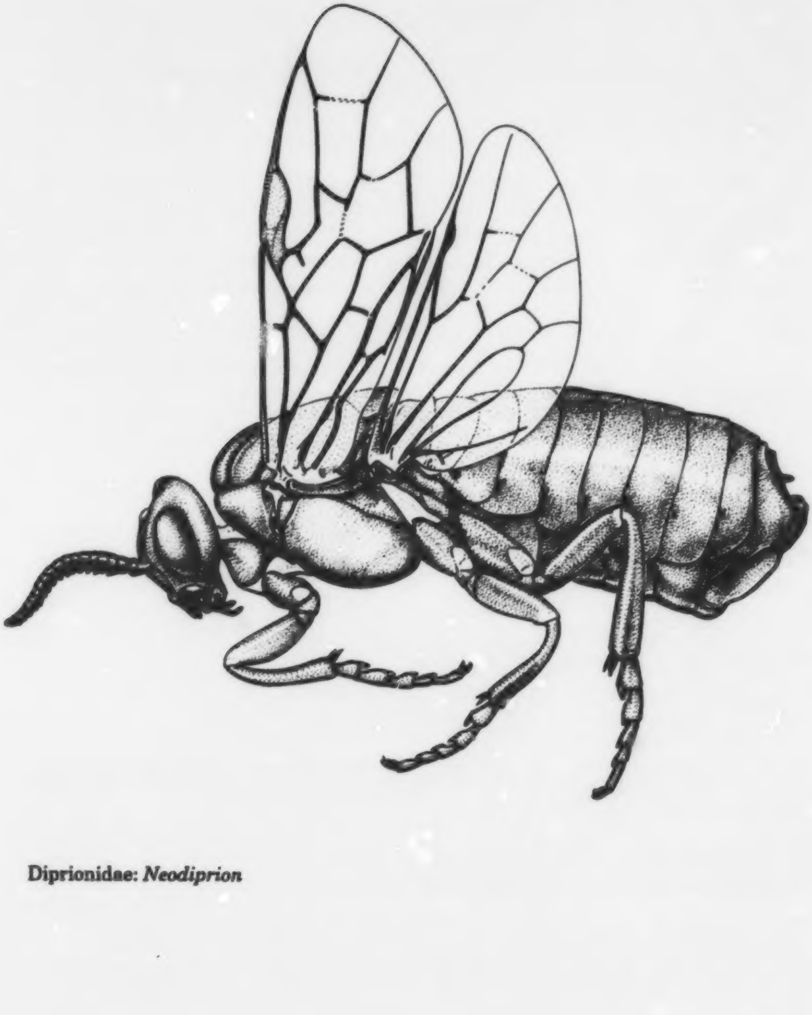
Nervure 2A de l'aile antérieure non fusionnée à la nervure 1A, mais reliée à celle-ci par une nervure transversale (fig. 93). Chez le mâle, chaque article du flagelle pourvu de deux projections pectinées (fig. 95). Surface centrale entre le clypéus et la cavité antennaire plate (fig. 92) .... Diprioninae 2

2(1) Cenchrus petit : largeur maximale égale à environ la moitié de la distance entre les cenchri (fig. 97). Métascutellum grand : longueur médiane supérieure à la largeur du cenchrus (fig. 97) .... ***Diprion* Shrank** (p. 71)

Cenchrus grand : largeur maximale supérieure à la distance entre les cenchri (fig. 98). Métascutellum petit : longueur médiane inférieure à la largeur du cenchrus (fig. 98) 3

3(2) Angle médian du bord antérieur du mésoscutellum obtus (fig. 98). Nervure à l'apex de la cellule anale de l'aile postérieure beaucoup plus longue que la largeur de la cellule (fig. 100) .... ***Gilpinia* Benson** (p. 72)

Angle médian du bord antérieur du mésoscutellum presque droit (fig. 99). Nervure à l'apex de la cellule anale de l'aile postérieure presque aussi longue que la largeur de la cellule (fig. 101) .... ***Neodiprion* Rohwer** (p. 71)



Diprionidae: ***Neodiprion***

Subfamily Monocteninae

Diagnosis. Adults of Monocteninae are distinguished from those of Diprioninae by the anal cell of the fore wing, which is constricted in the middle.

Diversity. The subfamily consists of three genera and 13 species (Smith 1974*a*). The subfamily's range extends over temperate regions of Eurasia, North Africa, and North America (Smith 1974*a*). In North America two genera and six species are known (Smith 1979*a*). In Canada one genus and three species are recorded.

Host. The larvae feed on various species of Cupressaceae (Smith 1974*a*).

Genus *Monoctenus* Dahlbom

Diagnosis. Adults of *Monoctenus* are distinguished from those of other genera of the subfamily by the convex middle surface above the clypeus.

Diversity. The genus consists of 10 species (Smith 1974*a*). In North America four species are known. In Canada three species are recorded (Smith 1979*a*, 1988*a*). The genus is restricted to eastern North America and extends into Mexico.

Host. Larvae feed on leaves of eastern white cedar and on juniper (Smith 1979*a*).

Comments. The genus has not been revised recently. Marlatt (1888) described the life history of one species.

Subfamily Diprioninae

Diagnosis. Adults of Diprioninae are distinguished from those of Monocteninae by the anal cell of the fore wing, which is divided by a crossvein.

Diversity. The subfamily consists of eight genera and 78 species (Smith 1974*a*). The subfamily's range extends over North Africa, Eurasia, and North America, south to Cuba and Nicaragua (Smith 1974*a*, 1988*a*). In North America five genera and 37 species are known (Smith 1979*a*). In Canada three genera and 16 species are recorded, but 21 species are expected.

Host. The larvae feed on various species of pine (Smith 1974*a*).

Genus *Neodiprion* Rohwer

Diagnosis. Adults of *Neodiprion* are distinguished from those of other North American genera of the family by large cenchri, which are wider than the distance between them, by the anterior margin of the mesoscutellum, which forms a right angle, and by the spine-like metatibial spur.

Diversity. The genus consists of more than 32 species (Smith 1974*a*). Except for a few species in Eurasia, the genus is restricted to North and Central America, as far south as El Salvador (Smith 1974*a*). In Canada 13 species are recorded, but 18 are expected.

Host. The larvae of most species feed on pine, but larvae of a few species are reported to feed on fir, spruce, hemlock, and Douglas fir (Smith 1979*a*).

Comments. Ross (1955) revised the North American species of the genus. Atwood (1961) presented an excellent account on the biology and taxonomical problems of species of the genus.

Genus *Diprion* Schrank

Diagnosis. Adults of *Diprion* are distinguished from those of other North American genera of the subfamily by the small cenchri, which are farther apart than the maximum width of a cenchrus.

Diversity. The genus consists of six species (Smith 1974*a*). Except for *D. similis* (Hartig), accidentally introduced into North America, the range of the genus is restricted to Eurasia (Smith 1974*a*). The range of *D. similis* is restricted to eastern North America (Smith 1979*a*).

Host. Larvae of *D. similis* feed on various species of pine (Smith 1979*a*).

Genus *Gilpinia* Benson

Diagnosis. Adults of *Gilpinia* are distinguished from those of other North American genera of the family by the large cenchri, which are wider than the distance between them, and by the anterior margin of the mesoscutellum, which forms an obtuse angle.

Diversity. The genus consists of 25 species (Smith 1974*a*). Except for two species introduced into North America, the genus is restricted to temperate and boreal regions of Eurasia (Smith 1974*a*). The two North American species are recorded in eastern Canada and in the eastern United States (Smith 1979*a*).

Host. Larvae of the North American species feed on leaves of pine and spruce, and those of Eurasian species have in addition been recorded in larch and *Cedrus* (Smith 1974*a*).

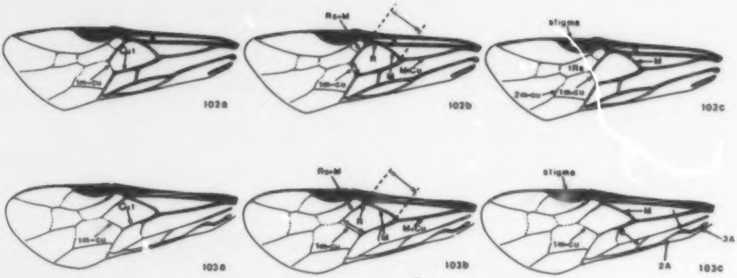
Comments. Benson (1952) characterized the two North American species.

FAMILY TENTHREDINIDAE

Diagnosis. Adults of Tenthredinidae are distinguished from those of other families by the presence of 7–10 flagellomeres, by the metapleuron clearly separated from the tergum 1, and by the long and clearly outlined (at least laterally) mesoscutellar appendage.

Diversity. The family consists of seven subfamilies, over 250 genera, and over 6000 species (Benson 1952; Smith 1979*a*). The family's range extends over most of the world except oceanic islands (excluding accidental introductions) and Antarctica, from the most frigid regions of the northern and southern hemispheres to hot, equatorial locations. Sawflies are more easily observed in temperate and boreal climates (Benson 1952). Though diverse in the tropics, they are difficult to collect. In North America 101 genera and over 800 species are recorded (Smith 1979). In Canada 89 genera and 565 species are known, but about 700 are expected to occur.

Host. Larvae of most species are external feeders on foliage, but those of some species are leaf miners, gall formers, or shoot borers (Benson 1952).



Figs. 102, 103. Fore wing. 102*a*, 102*b*, 102*c*, *Pristiphora erichsonii* (Hartig); 103*a*, 103*b*, 103*c*, *Empria maculata* (Norton).

Key to subfamilies of Tenthredinidae

1 Fore and hind wings shorter than length of abdomen .... Nematinae (few taxa: Key to genera p. 99)

Fore and hind wings as long as or longer than length of abdomen 2

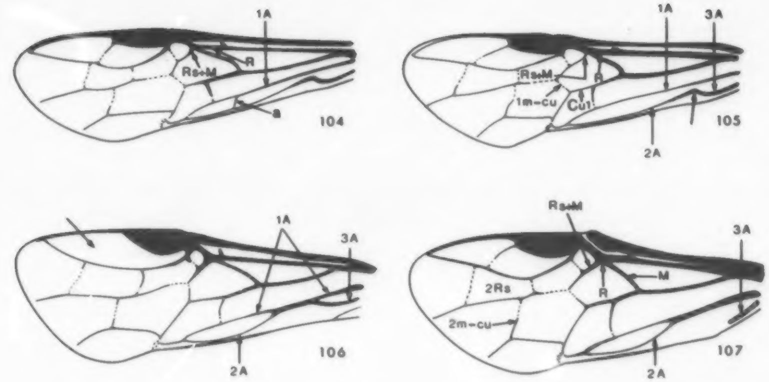
2(1) Veins 1m-cu and Cu_1 of fore wing meeting at an angle of 80–110° (Fig. 102*a*). Distance between junctions in fore wing of veins M with M+Cu and those of Rs+M with R 1.8 times or more than length of 1m-cu (except in specimens of *Adelesta*) (Fig. 102*b*). Fore wing with main axis of vein M and that of 1m-cu clearly convergent toward stigma in specimens of most taxa (Fig. 102*c*) 3

Veins 1m-cu and Cu_1 of fore wing usually meeting at an angle of 120–150° (Fig. 103*a*). Distance between junctions in fore wing of veins M with M+Cu and those of Rs+M with R 1.8 times or less than length of 1m-cu (Fig. 103*b*). Fore wing with main axis of vein M and that of 1m-cu subparallel in specimens of most taxa (Fig. 103*c*) 10

3(2) Veins 2A and 3A of fore wing fully developed and not fused to 1A (weakly sclerotized in specimens of *Heptamelus*) (Figs. 105, 108) 4

Veins 2A and 3A of fore wing not completely outlined (Fig. 107) or completely outlined and fused to 1A (Fig. 106) 5

4(3) Anal crossvein of fore wing absent (Fig. 105), or developed and almost perpendicular, or oblique with vein 1A (Fig. 104). Vein Rs+M of fore wing near junction with R curved (Fig. 104) ..... Selandriinae (most taxa: Key to genera p. 81)



Figs. 104–107. Fore wing. 104, ***Hemitaxonus albidopictus*** **(Norton); 105,** *Strongylogaster distans* Norton; 106, *Trichiocampus viminalis* (Fallén); 107, *Tethida barda* (Say).

Anal crossvein of fore wing developed and clearly oblique in relation to vein 1A (Fig. 108). Vein Rs+M of fore wing straight near junction with R (Fig. 108) .... Heterarthrinae (few taxa: Key to genera p. 99)

5(3) Vein 2m-cu of fore wing joining cell 2Rs (Figs. 107, 109) 6

Vein 2m-cu of fore wing joining cell 1Rs (Fig. 102*c*) or joining cell 2Rs (aberrant specimens) almost at vein 2r-m .... Nematinae (most taxa: Key to genera p. 99)

6(5) Vein 2r of fore wing absent (Fig. 106) .... Nematinae (few taxa: Key to genera p. 99)

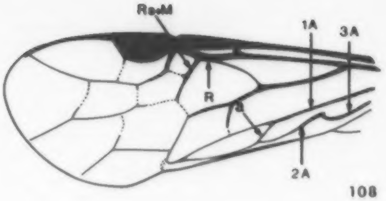
Vein 2r of fore wing developed (Fig. 109) 7

7(6) Fore wing with vein M meeting R at or just near junction of Rs+M and R (Fig. 107) 8

Fore wing with vein M meeting R well before junction of Rs+M and R (Fig. 109) 9

8(7) Epicnemial surface sharply outlined by furrow (Fig. 111). Large: 7–9 mm .... Blennocampinae (few taxa: Key to genera p. 144)

Epicnemial surface not outlined or outlined by shallow and short furrow (Fig. 110). Small: 3–6 mm .... Heterarthrinae (most taxa: Key to genera p. 134)



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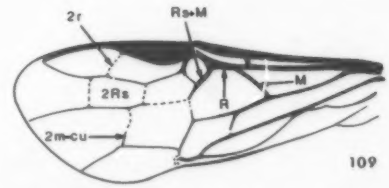

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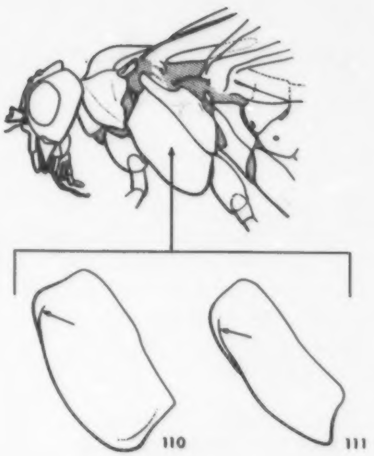


Figs. 108, 109. Fore wing. 108, *Endelomyia aethiops* (Fabricius); 109, *Hoplocampa halcyon* (Norton).
Figs. 110, 111. Lateral view of mesepisternum. 110, *Nefusa ambigua* (Norton); 111, *H. testudinea* (Klug).

9(7) Epicnemial surface not outlined. Large: 7–9 mm .... Susaninae: ***Susana* Rohwer & Middleton** (p. 98)

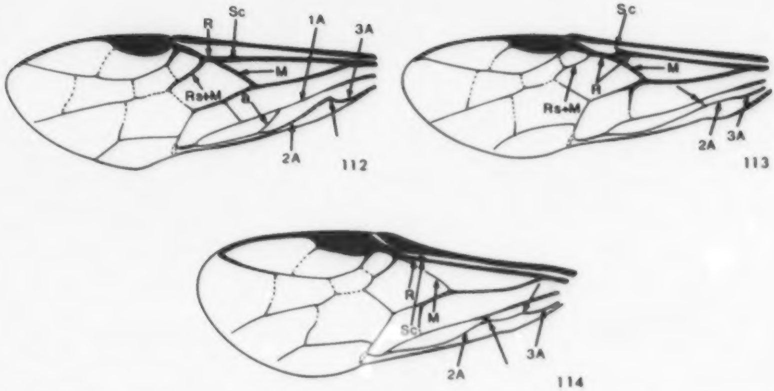
Epicnemial surface sharply outlined by furrow (Fig. 111). Small: 3–6 mm .... Nematinae: ***Hoplocampa* Hartig** and ***Caulocampus* Rohwer** (p. 101)

10(2) Vein R of fore wing clearly deviated between junctions of M and Sc (Fig. 113) 11

Vein R of fore wing not deviated between junctions of M and Sc (Fig. 114) 12

11(10) R between junctions with M and Rs+M short (Fig. 112). Basal anal cell clearly constricted along vein 2A and 3A (Fig. 112). Crossvein of anal cell of fore wing long and oblique in relation with vein 1A (Fig. 112). Metepimeron fused to metepisternum or more or less separated but not by a furrow (Fig. 122) .... Allantinae (few taxa: Key to genera p. 164)

R between junctions with M and Rs+M long (Fig. 113). Basal anal cell weakly or not constricted along vein 2A and 3A (Fig. 113). Crossvein of anal cell of fore wing lacking or developed (perpendicular and short, Fig. 113). Metepimeron clearly separated from metepisternum by furrow (Fig. 121) ..... Tenthredininae (Key to genera p. 179)



Figs. 112–114. Fore wing. 112, *Dimorphopteryx melanognathus* Rohwer; 113, *Aglaostigma quattuordecimpunctatum* (Norton); 114, *Blennogeneris spissipes* (Cresson).

12(10) Vein 2A and 3A of fore wing complete and markedly constricted (Figs. 103*c*, 105). Crossvein of anal cell of fore wing lacking (Fig. 105) or developed and long (Fig. 103*c*) 13

Vein 2A and 3A of fore wing not completely outlined (Fig. 107) or completely outlined and slightly constricted (Fig. 114). Crossvein of anal cell of fore wing usually lacking or developed and short (Fig. 114) .... Blennocampinae (most taxa: Key to genera p. 144)

13(12) Vein Rs+M of fore wing near junction with R curved (Fig. 105). Crossvein of anal cell of fore wing lacking (Fig. 105). Veins 1m-cu and Cu$_1$ of fore wing meeting at an angle of 110–130° (Fig. 105) .... Selandriinae (few taxa: Key to genera p. 81)

Vein Rs+M of fore wing near junction with R straight or slightly curved (Fig. 103*b*). Crossvein of anal cell of fore wing developed (lacking in few aberrant specimens) (Fig. 103*c*). Veins 1m-cu and Cu$_1$ of fore wing meeting at an angle of 140–150° (Fig. 103*a*) .... Allantinae (most taxa: Key to genera p. 164)

Clé des sous-familles de Tenthredinidae

1 Ailes antérieures et postérieures plus courtes que l'abdomen .... Nematinae (peu de taxa : clé des genres p. 99)

Ailes antérieures et postérieures aussi longues ou plus longues que l'abdomen 2

2(1) Nervures 1m-cu et Cu_1 de l'aile antérieure formant un angle de 80 à 110° (fig. 102a). Dans l'aile antérieure, distance entre les jonctions des nervures M avec M+Cu et celles des nervures Rs+M avec R égale ou supérieure à 1,8 fois la longueur de 1m-cu (sauf chez les spécimens d'*Adelesta*) (fig. 102*b*). Axe principal de la nervure M et celui de la nervure 1m-cu de l'aile antérieure convergeant clairement vers le stigma chez les spécimens de la plupart des taxa (fig. 102*c*) 3

Nervures 1m-cu et Cu_1 de l'aile antérieure formant généralement un angle de 120 à 150° (fig. 103*a*). Dans l'aile antérieure, distance entre les jonctions des nervures M avec M+Cu et des nervures Rs+M avec R égale ou inférieure à 1,8 fois la longueur de 1m-cu (fig. 103*b*). Axe principal de la nervure M et celui de la nervure 1m-cu de l'aile antérieure subparallèles chez les spécimens de la plupart des taxa (fig. 103c) 10

3(2) Nervures 2A et 3A de l'aile antérieure complètement développées et non fusionnées à 1A (faiblement sclérotisées chez les spécimens de *Heptamelus*) (fig. 105, 108) 4

Nervures 2A et 3A de l'aile antérieure pas complètement définies (fig. 107) ou complètement définies et fusionnées à 1A (fig. 106) 5

4(3) Nervure transversale anale de l'aile antérieure absente (fig. 105), ou présente et presque perpendiculaire, ou oblique par rapport à la nervure 1A (fig. 104). Nervure Rs+M de l'aile antérieure courbée près de la jonction avec la nervure R (fig. 104) .... Selandriinae (la plupart des taxa : clé des genres p. 81)

Nervure transversale anale de l'aile antérieure présente et nettement oblique par rapport à la nervure 1A (fig. 108). Nervure Rs+M de l'aile antérieure rectiligne près de la jonction avec la nervure R (fig. 108) .... Heterarthrinae (peu de taxa : clé des genres p. 99)

5(3) Nervure 2m-cu de l'aile antérieure rejoignant la nervure 2Rs (fig. 107, 109) 6

Nervure 2m-cu de l'aile antérieure rejoignant la cellule 1Rs (fig. 102c) ou la cellule 2Rs (spécimens aberrants) presque à la nervure 2r-m .... Nematinae (la plupart des taxa : clé des genres p. 99)

6(5) Nervure 2r de l'aile antérieure absente (fig. 106) .... Nematinae (peu de taxa : clé des genres p. 99)

Nervure 2r de l'aile antérieure présente (fig. 109) 7

7(6) Nervure M de l'aile antérieure rejoignant la nervure R à la jonction ou tout près de la jonction des nervures Rs+M et R (fig. 107) 8

Nervure M de l'aile antérieure rejoignant la nervure R bien avant la jonction des nervures Rs+M et R (fig. 109) 9

8(7) Epicnémium clairement défini par un sillon (fig. 111). Grand : 7 à 9 mm .... Blennocampinae (peu de taxa : clé des genres p. 144)

Epicnémium non défini ou défini par un sillon court et peu profond (fig. 110). Petit : 3 à 6 mm .... Heterarthrinae (la plupart des taxa : clé des genres p. 134)

9(7) Epicnémium non défini. Grand : 7 à 9 mm .... Susaninae : ***Susana* Rohwer & Middleton** (p. 98)

Epicnémium clairement défini par un sillon (fig. 111). Petit : 3 à 6 mm ....Nematinae : ***Hoplocampa* Hertig** et ***Caulocampus* Rohwer** (p. 101)

10(2) Nervure R de l'aile antérieure s'écartant nettement entre les jonctions des nervures M et Sc (fig. 113) 11

Nervure R de l'aile antérieure ne s'écartant pas entre les jonctions des nervures M et Sc (fig. 114) 12

11(10) Nervure R entre les jonctions avec M et Rs+M, courte (fig. 112). Cellule anale basale nettement étranglée le long des nervures 2A et 3A (fig. 112). Nervure transversale de la cellule anale de l'aile antérieure longue et oblique par rapport à la nervure 1A (fig. 112). Métépimère fusionnée au métépisternum ou plus ou moins séparée , mais pas par un sillon (fig. 122) .... Allantinae (peu de taxa : clé des genres p. 164)

Nervure R entre les jonctions avec M et Rs+M, longue (fig. 113). Cellule anale basale peu ou pas étranglée le long des nervures 2A et 3A (fig. 113). Nervure transversale de la cellule anale de l'aile antérieure absente ou présente (perpendiculaire et courte, fig. 113). Métépimère nettement séparée du métépisternum par un sillon (fig. 121) .... Tenthredininae (clé des genres p. 179)

12(10) Nervures 2A et 3A de l'aile antérieure complètes et fortement étranglées (fig. 103*c*, 105). Nervure transversale de la cellule anale de l'aile antérieure absente (fig. 105) ou présente et longue (fig. 103*c*) 13

Nervures 2A et 3A de l'aile antérieure pas complètement définies (fig. 107) ou complètement définies et légèrement étranglées (fig. 114). Nervure transversale de la cellule anale de l'aile antérieure généralement absente ou présente et courte (fig. 114) ....
Blennocampinae (la plupart des taxa : clé des genres p. 144)

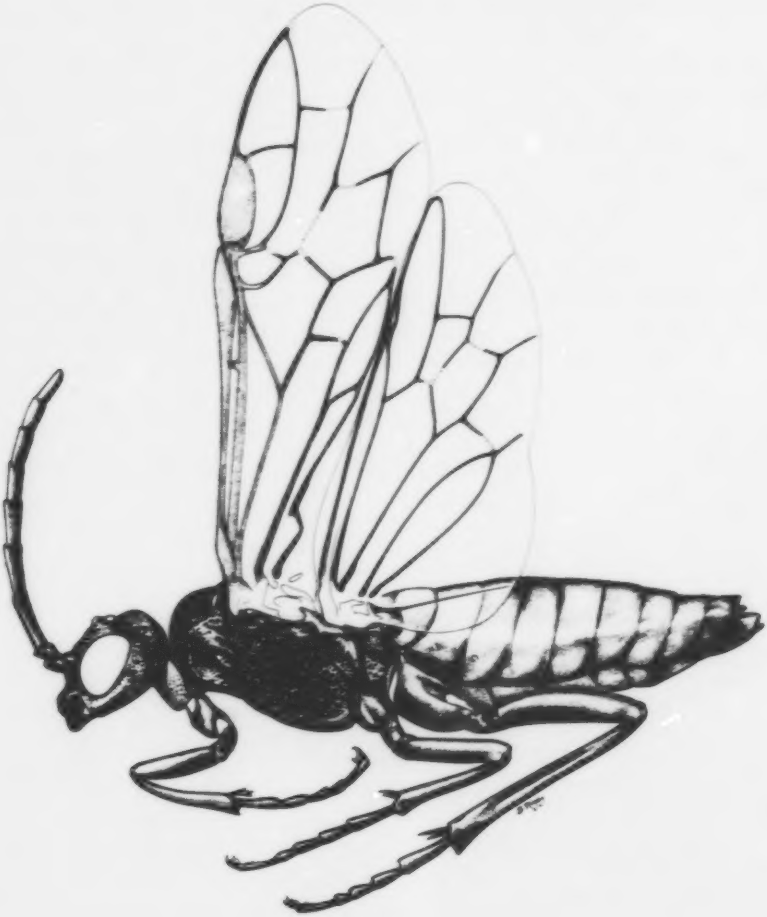
13(12) Nervure Rs+M de l'aile antérieure courbée près de la jonction avec R (fig. 105). Nervure transversale de la cellule anale de l'aile antérieure absente (fig. 105). Nervures 1m-cu et Cu_1 de l'aile antérieure formant un angle de 110 à 130° (fig. 105) ....
.... Selandriinae (peu de taxa : clé des genres p. 81)

Nervures Rs+M de l'aile antérieure rectiligne ou légèrement courbée près de la jonction avec R (fig. 103*b*). Nervure transversale de la cellule anale de l'aile antérieure présente (absente chez quelques spécimens aberrants) (fig. 103*c*). Nervures 1m-cu et Cu_1 de l'aile antérieure formant un angle de 140 à 150° (fig. 103*a*) ....
Allantinae (la plupart des taxa : clé des genres p. 164)

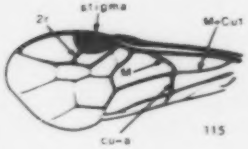
Subfamily Selandriinae

Diagnosis. Adults of Selandriinae are distinguished from those of other subfamilies by the curved vein Rs+M in the fore wing near the junction with the vein R and by the completely developed vein 2A and 3A of the fore wing.

Diversity. The subfamily's range extends throughout Eurasia, North, Central, and South America, and Africa, from the boreal to the tropical zones (Smith 1969*a*). In North America 13 genera and 100 species are known (Smith 1969*a*; Goulet 1986). In Canada nine genera and 73 species are recorded, but 82 species are expected.



Tenthredinidae: ***Dolerus***



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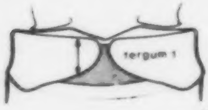

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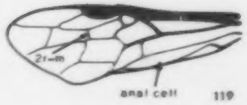

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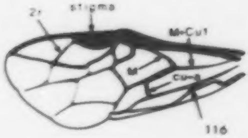

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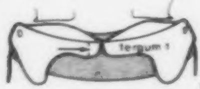

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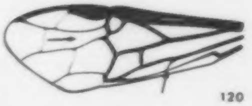

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Figs. 115, 116. Fore wing. 115, *Heptamelus ochroleucus* (Stephens); 116, *Adelesta nova* (Norton).
Figs. 117, 118. Tergum 1 (membrane stippled). 117, *Dolerus neocollaris* MacGillivray; 118, *A. nova*.
Figs. 119, 120. Fore wing. 119, *Strongylogaster distans* Norton; 120, *D. neocollaris*.

Key to tribes, genera, and subgenera of Selandriinae

1 Stigma of fore wing as wide as length of vein 2r, and vein 2r originating far from apex of stigma (Fig. 115). Fore wing veins M and cu-a touching at vein $M+Cu_1$ (Fig. 115). Antenna with 5 or 6 flagellomeres. Pedicel of antenna about twice as long as wide .... Heptamelini: ***Heptamelus* Haliday** (p. 94)

Stigma of fore wing markedly narrower than length of vein 2r, and vein 2r originating near apex of stigma (Fig. 116). Fore wing veins M and cu-a far apart at their junction with vein $M+Cu_1$ (Fig. 116). Antenna with 7 flagellomeres. Pedicel about as long as wide or 1.5 times as long as wide 2

2(1) Anal crossvein of fore wing dividing anal cell near middle (Fig. 116). Medial length of mesoscutellar appendage about 50 µm. Membranous surface between terga 1 and 2 large: tergum 1 narrow near middle (Fig. 118) .... Adelestini: ***Adelesta* Ross** (p. 94)

Anal crossvein of fore wing dividing anal cell about one-third before apex (Fig. 120) or crossvein absent (Fig. 119). Medial length of mesoscutellar appendage 80–250 µm. Membranous surface between terga 1 and 2 narrow: tergum 1 wide near middle (Fig. 117) 3

3(2) Mesepisternum with inverted V-shaped furrow near dorsal angle (Fig. 124). Vein 1r-m of hind wing joined to vein R .... Selandriini: ***Brachythops*** **Haliday** (p. 93)

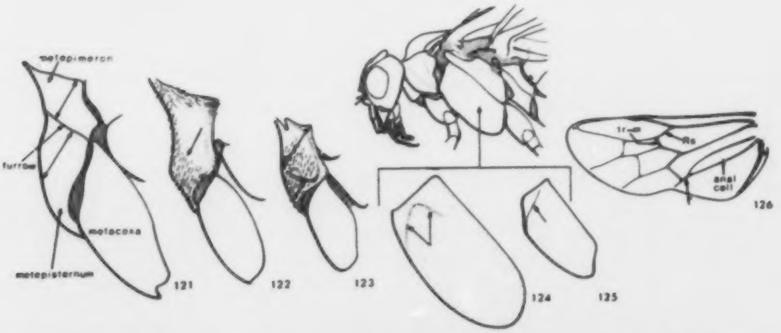
Mesepisternum without furrow except, when developed, for epicnemial furrow (Fig. 125). Vein 1r-m of hind wing joined to vein Rs (Fig. 126) 4

4(3) Lateral lobe of mesoscutum pitted. Vein 2r-m of fore wing lacking (developed in some specimens of *Dolerus* s. str.) (Fig. 120). Furrow between metepimeron and metepisternum clearly outlined, and metepimeron as high as metepisternum in lateral view (Fig. 121). Crossvein of anal cell of fore wing oblique (Fig. 120) .... Dolerini: ***Dolerus*** **Panzer** (p. 95) 5

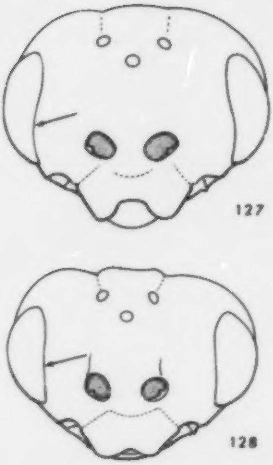
Lateral lobe of mesoscutum not pitted. Vein 2r-m of fore wing developed (Fig. 119). Metepimeron hardly outlined (Fig. 122) or quite clearly outlined and 1.5 times as high as metepisternum in lateral view (Fig. 123). Crossvein of fore wing, if developed, almost perpendicular (Fig. 104) 12

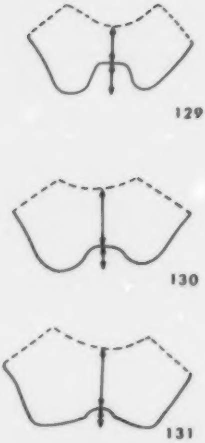
5(4) Eye with inner margin concave (Fig. 127). White pigment developed on tegula and on all or part of labrum in specimens with orange terga. (Setae of cercus less than 200 μm in length) 6

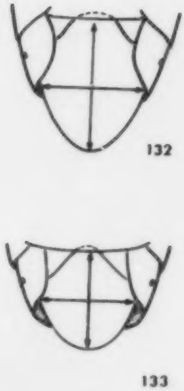
Eye with inner margin straight (Fig. 128). White pigment not developed on any part of body 8



Figs. 121–123. Lateral view of metapleuron. 121, *Dolerus neocollaris* MacGillivray; 122, *Aneugmenus flavipes* (Norton); 123, *Strongylogaster rufigastra* (Kincaid).
Figs. 124, 125. Mesepisternum, lateral view. 124, *Brachythops wuestneii* (Konow); 125, *Hemitaxonus dubitatus* (Norton).
Fig. 126. Hind wing of *Nesoselandria morio* (Fabricius).







Figs. 127, 128. Frontal view of head. 127, *Dolerus tibialis* Cresson; 128, *D. apricus* (Norton).

Figs. 129–131. Clypeus. 129, *D. apricus*; 130, *D. yukonensis* Norton; 131, *D. rufilobus* Ross.

Figs. 132, 133. Last abdominal sternum of male. 132, *D. unicolor* (Beauvois); 133, *D. tibialis*.

6(5) Pits mainly round and deep, clearly outlined on mesepisternum. Clypeal emargination as deep as clypeal midline length (Fig. 129). Length of valvula 3: 700–800 µm .... **Subgenus *Dicrodolerus* Goulet** (p. 97)

Pits mainly polygonal and shallow, outlined on mesepisternum or weakly so. Clypeal emargination as deep as 0.3–0.8 of clypeal midline length (Figs. 130, 131). Length of valvula 3 less than 600 µm or more than 900 µm 7

7(6) Clypeal emargination as deep as 0.6–0.8 of clypeal midline length (Fig. 130). Ventral part of metepisternum not pitted and without setae. Mesoscutellar appendage smooth .... **Subgenus *Loderus* Konow** (p. 97)

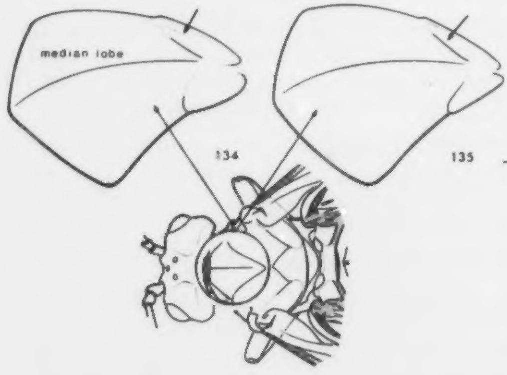
Clypeal emargination as deep as 0.3–0.4 of clypeal midline length (Fig. 131). Ventral part of metepisternum pitted and with many setae. Mesoscutellar appendage clearly sculptured .... **Subgenus *Oncodolerus* Goulet** (p. 96)

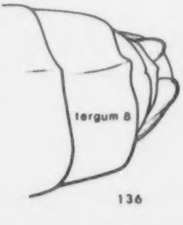
8(5) Postocellar area 0.7–1.0 as long as wide. Longest setae of valvula 3 black. Sternum 9 in male 1.25–1.5 as long as wide (Fig. 132). Tergum 8 in male without setae along middle. (Clypeal emargination as deep as clypeal medial length.) .... **Subgenus *Dosytheus* Leach** (p. 98)

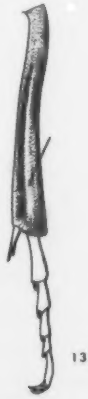
Postocellar area less than 0.7 as long as wide. Longest setae of valvula 3 straw-colored or brown. Sternum 9 in male about as long as wide (Fig. 133) or 1.25–1.5 times longer than wide. Tergum 8 with setae anteriorly at middle 9

9(8) Outer surface of metatibia with wide furrow: tibia almost square in cross section (Fig. 137). Posterior angle of median lobe with large and triangular depression (Fig. 134). Tergum 8 in male markedly raised near posterior margin at middle (Fig. 136). (Sternum 9 in male 1.25–1.5 times as long as wide. Body black.) .... **Subgenus *Neodolerus* Goulet** (p. 96)

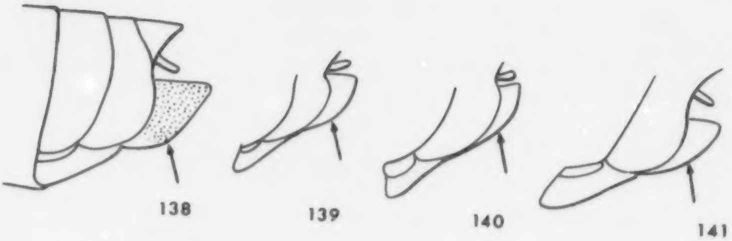
Outer surface of metatibia without furrow: tibia round in cross section or with outer furrow and body having orange surfaces. Posterior angle of median lobe with narrow depression (Fig. 135). Tergum 8 in male slightly raised near posterior margin at middle 10

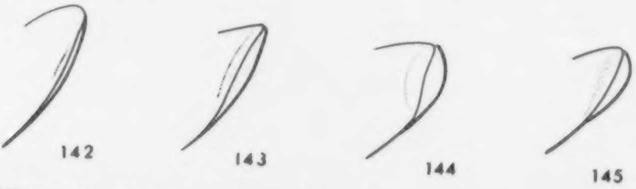






Figs. 134, 135. Median lobes of mesoscutum (anterior and lateral view). 134, *Dolerus sericeus* Say; 135, *D. tibialis* Cresson.
Fig. 136. Last abdominal tergum of male of *D. sericeus* (anterior and lateral view).
Fig. 137. Outer surface of metatibia of *D. apriloides* MacGillivray.





Figs. 138–141. Lateral view of valvula 3. 138, *Dolerus similis* (Norton); 139, *D. elderi* Kincaid; 140, *D. eurybis* Ross; 141, *D. sayi* Goulet.
Figs. 142–145. Valvula 3 (posterior and lateral view). 142, *D. incisus* Goulet; 143, *D. decussatus* Goulet; 144, *D. eurybis*; 145, *D. nortoni* Ross.

10(9) Female: valvula 3 in lateral view with dorsal margin 1000 µm or more in length; setae of cercus, even in large specimens (9–13 mm), less than 250 µm in length. Male: tergum 8 with setae on almost all of medial part; sternum 9, 1.25–1.5 times as long as wide (Fig. 132). (Pits 60–80 microns in diameter on mesepisternum.) .... ***Dolerus: nitens* group** (p. 95)

Female: valvula 3 in lateral view with dorsal margin 1000 µm or less; setae of cercus 200 µm long or longer in small specimens (5–6 mm), or longer than 250 µm in large specimens (8–13 mm). Male: tergum 8 without setae along middle; sternum 9 as long as wide (Fig. 133) 11

11(10) Female: ventral margin of valvula 3 in lateral view weakly angular in basal half (Figs. 138, 139); valvula 3 in posterior view not flattened on posterior margin (Fig. 142). Metapleuron black. Male: metapleuron black and pits of mesepisternum 100–150 µm in diameter .... **Subgenus *Dolerus* Panzer** (p. 97)

Female: ventral margin of valvula 3 in lateral view curved or weakly angular in posterior half (Figs. 140, 141); valvula 3 in posterior view flattened on posterior margin (Figs. 143, 144) or convex (Fig. 145). Metapleuron orange. Male: metapleuron orange if pits about 100 µm in diameter; otherwise, pits of mesepisternum 60–80 µm .... **Subgenus *Achaetoprion* Goulet** (p. 96)

12(4) Median lobe of mesoscutum three times longer than wide or less than 2.5 times longer than wide and mesepisternum pitted. Metepimeron pubescent at least on ventral part of disc .... Strongylogastrini 13

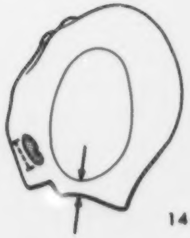
Median lobe of mesoscutum 2.0–2.5 times longer than wide. Mesepisternum not pitted. Metepimeron not pubescent on disc .... Aneugmenini 14

13(12) Median lobe of mesoscutum without setae. Mesepisternum with scattered (50–150 µm apart) setae on disc. Anal cell of fore wing with crossvein (Figs. 104, 120) .... ***Hemitaxonus* Ashmead** (p. 91)

Median lobe of mesoscutum with setae at least near anterolateral margin. Mesepisternum with setae dense (about 50 µm apart) on disc. Anal cell of fore wing with or without crossvein (Fig. 119) .... ***Strongylogaster* Dahlbom** (p. 91)

14(12) Mesoscutellum pitted. Head in lateral view with occipital ridge at least near mandible (Fig. 147). Anal cell of hind wing without vein at apex (Fig. 148) .... ***Aneugmenus* Hartig** (p. 92)

Mesoscutellum not pitted. Head in lateral view without occipital ridge (Fig. 146). Anal cell of hind wing with clearly developed vein at apex (Fig. 126) 15



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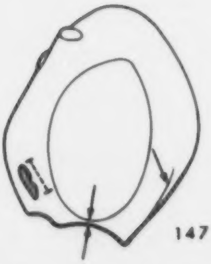

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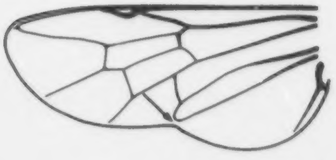

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Figs. 146, 147. Lateral view of head. 146, *Birka nordica* Smith; 147, *Aneugmenus flavipes* (Norton).
Fig. 148. Hind wing of *A. flavipes*.

15(14) Flagellomere 1, 1.5 times as long as 2. Claw with long and slender preapical tooth. Minimum malar space about 0.2 of diameter of antennal socket (Fig. 147) .... ***Nesoselandria* Rohwer** (p. 93)

Flagellomere 1 about as long as 2. Claw with short and stout preapical tooth. Minimum malar space 0.4–0.5 of diameter of antennal socket (Fig. 146) .... ***Birka* Malaise** (p. 92)

Clé des tribus, des genres et des sous-genres de Selandriinae

1 Stigma de l'aile antérieure aussi large que la longueur de la nervure 2r, et nervure 2r prenant naissance loin de l'apex du stigma (fig.115). Nervures M et cu-a de l'aile antérieure se touchant à leur jonction avec la nervure M+Cu$_1$ (fig.115). Antenne de 5 ou 6 articles. Pédicelle de l'antenne à peu près deux fois plus long que large .... Heptamelini : ***Heptamelus* Haliday** (p. 94)

Stigma de l'aile antérieure nettement plus étroit que la longueur de la nervure 2r, et nervure 2r prenant naissance près de l'apex du stigma (fig.116). Nervures M et cu-a de l'aile antérieure très éloignées à leur jonction avec la nervure M+Cu$_1$ (fig.116). Antenne de 7 articles. Pédicelle à peu près aussi long que large ou 1,5 fois plus long que large 2

2(1) Nervure transversale de l'aile antérieure divisant la cellule anale près du centre (fig.116). Longueur médiane de l'appendice mésoscutellaire : environ 50 µm. Surface membraneuse entre les terga 1 et 2, grande : tergum 1 étroit près du centre (fig.118) .... Adelestini : ***Adelesta* Ross** (p. 94)

Nervure transversale de l'aile antérieure divisant la cellule anale à environ un tiers de la distance à partir de l'apex (fig. 120) ou absente (fig. 119). Longueur médiane de l'appendice mésoscutellaire : 80 à 250 µm. Surface membraneuse entre les terga 1 et 2, étroite : tergum 1 large près du centre (fig. 117) 3

3(2) Mésépisternum pourvu d'un sillon en forme de V inversé près de l'angle dorsal (fig.124). Nervure 1r-m de l'aile postérieure reliée à la nervure R .... Selandriini : ***Brachythops* Haliday** (p. 93)

Mésépisternum sans sillon, à l'exception du sillon épicnémial, lorsqu'il est présent (fig.125). Nervure 1r-m de l'aile postérieure reliée à la nervure Rs (fig.126) 4

4(3) Lobe latéral du mésoscutum ponctué. Nervure 2r-m de l'aile antérieure absente (présente chez certains spécimens de *Dolerus* s.str.) (fig.120). Sillon entre le métépimère et le métépisternum nettement défini et métépimère aussi haut que le métépisternum en vue latérale (fig.121). Nervure transversale de la cellule anale de l'aile antérieure oblique (fig.120) .... Dolerini : ***Dolerus* Panzer** (p. 95) 5

Lobe latéral du mésoscutum non ponctué. Nervure 2r-m de l'aile antérieure présente (fig.119). Métépimère à peine défini (fig.122) ou assez clairement défini et 1,5 fois plus haut que le métépisternum en vue latérale (fig.123). Nervure transversale de l'aile antérieure, si présente, presque perpendiculaire (fig.104) 12

5(4) Oeil à bord interne concave (fig.127). Présence de pigments blancs sur la tégula et sur tout ou sur une partie du labre chez les spécimens à terga orange. (Soies du cerque mesurant moins de 200 μm de long) 6

Oeil à bord interne rectiligne (fig.128). Absence de pigments blancs sur toute la surface du corps 8

6(5) Fosses surtout arrondies et profondes, nettement définies sur le mésépisternum. Échancrure clypéale aussi profonde que la longueur médiane du clypéus (fig.129). Longueur de la valvule 3 : 700 à 800 μm .... **Sous-genre *Dicrodolerus* Goulet** (p. 97)

Fosses surtout polygonales et peu profondes, définies ou faiblement définies sur le mésépisternum. Échancrure clypéale aussi profonde que 0,3 à 0,8 fois la longueur médiane du clypéus (fig.130, 131). Longueur de la valvule 3 inférieure à 600 μm ou supérieure à 900 μm 7

7(6) Échancrure clypéale aussi profonde que 0,6 à 0,8 fois la longueur médiane du clypéus (fig.130). Partie ventrale du métépisternum non ponctuée et non pourvue de soies. Appendice mésoscutellaire lisse .... **Sous-genre *Loderus* Konow** (p. 97)

Échancrure clypéale aussi profonde que 0,3 à 0,4 fois la longueur médiane du clypéus (fig. 131). Partie ventrale du métépisternum ponctuée et pourvue de nombreuses soies. Appendice mésoscutellaire nettement sculpté .... **Sous-genre *Oncodolerus* Goulet** (p. 96)

8(5) Région postocellaire 0,7 à 1,0 fois plus longue que large. Soie la plus longue de la valvule 3, noire. Sternum 9 du mâle 1,25 à 1,5 fois plus long que large (fig. 132). Tergum 8 du mâle sans soies le long de la ligne médiane. (Échancrure clypéale aussi profonde que la longueur médiane du clypéus) .... **Sous-genre *Dosytheus* Leach** (p. 98)

Région postocellaire moins de 0,7 fois aussi longue que large. Soie la plus longue de la valvule 3 brune ou de couleur paille. Sternum 9 du mâle à peu près aussi long que large (fig. 133) ou 1,25 à 1,5 fois plus long que large. Tergum 8 pourvu de soies dans la partie antérieure, au milieu 9

9(8) Surface externe du métatibia pourvue d'un large sillon : tibia presque carré en section transversale (fig. 137). Angle postérieur du lobe médian présentant une grande dépression triangulaire (fig. 134). Tergum 8 du mâle nettement surélevé près du bord postérieur dans la région médiane (fig. 136). (Sternum 9 du mâle 1,25 à 1,5 fois plus long que large. Corps noir) .... **Sous-genre *Neodolerus* Goulet** (p. 96)

Surface externe du métatibia non pourvue d'un sillon : tibia arrondi en section transversale ou pourvu d'un sillon sur la face externe et corps présentant des surfaces orange. Angle postérieur du lobe médian présentant une dépression étroite (fig.135). Tergum 8 du mâle légèrement surélevé près du bord postérieur dans la réion médiane 10

10(9) Femelle : en vue latérale, bord dorsal de la valvule 3 d'une longueur égale ou supérieure à 1000 µm; soies du cerque, même chez les grands spécimens (9à13 mm), d'une longueur inférieure à 250 µm. Mâle : tergum 8 pourvu de soies sur presque toute sa partie médiane; sternum 9 de 1,25 à 1,5 fois plus long que large (fig. 132). (Fosses de 60 à 80 microns de diamètre sur le mésépisternum.) .... ***Dolerus* : groupe *nitens*** (p. 95)

Femelle : en vue latérale, bord dorsal de la valvule 3 d'une longueur égale ou inférieure à 1000 µm; soies du cerque d'une longueur de 200 µm ou plus chez les petits spécimens (5 à 6 mm), ou de plus de 250 µm chez les grands spécimens (8 à 13 mm). Mâle : tergum 8 sans soies le long de la ligne médiane; sternum 9 aussi long que large (fig. 133) 11

11(10) Femelle : en vue latérale, bord ventral de la valvule 3 faiblement angulaire dans la moitié basale (fig. 138, 139); en vue postérieure, valvule 3 non aplatie sur le bord postérieur (fig. 142). Métapleure noir. Mâle : métapleure noir et fosses du mésépisternum d'un diamètre de 100 à 150 µm .... **Sous-genre *Dolerus* Panzer** (p. 97)

Femelle : en vue latérale, bord ventral de la valvule 3 courbé ou faiblement angulaire dans la moitié postérieure (fig. 140, 141); en vue postérieure, valvule 3 aplatie sur le bord postérieur (fig. 143, 144) ou convexe (fig. 145). Métapleure orange. Mâle : métapleure orange si les fosses mesurent environ 100 µm de diamètre; autrement, fosses du mésépisternum mesurant 60 à 80 µm de diamètre .... **Sous-genre *Achaetoprion* Goulet** (p. 96)

12(4) Lobe médian du mésoscutum trois fois plus long que large ou moins de 2,5 fois plus long que large et mésépisternum ponctué. Métépimère pubescent au moins sur la partie ventrale du disque .... Strongylogastrini 13

Lobe médian du mésoscutum 2,0 à 2,5 fois plus long que large. Mésépisternum non ponctué. Métépimère non pubescent sur le disque .... Aneugmenini 14

13(12) Lobe médian du mésoscutum dépourvu de soies. Disque du mésépisternum pourvu de soies dispersées (de 50 à 150 µm d'écart). Cellule anale de l'aile antérieure avec nervure transversale (fig. 104, 120) .... ***Hemitaxonus* Ashmead** (p. 91)

Lobe médian du mésoscutum pourvu de soies au moins près du bord antérolatéral. Disque du mésépisternum pourvu de soies denses (environ 50 µm d'écart). Cellule anale de l'aile antérieure avec ou sans nervure transversale (fig. 119) .... ***Strongylogaster* Dahlbom** (p. 91)

14(12) Mésoscutellum ponctué. En vue latérale, tête présentant une carène occipitale au moins près de la mandibule (fig. 147). Cellule anale de l'aile postérieure sans nervure à l'apex (fig. 148) .... ***Aneugmenus* Hartig** (p. 92)

Mésoscutellum non ponctué. En vue latérale, tête sans carène occipitale (fig. 146). Cellule anale de l'aile postérieure avec une nervure transversale nettement visible à l'apex (fig. 126) 15

15(14) Article 1 du flagelle 1,5 fois la longueur de l'article 2. Griffe à dent préapicale longue et mince. Surface malaire minimale environ 0,2 fois le diamètre de la cavité antennaire (fig. 147) .... ***Nesoselandria* Rohwer** (p. 93)

Article 1 du flagelle à peu près aussi long que l'article 2. Griffe pourvue d'une dent préapicale courte et forte. Surface malaire minimale 0,4 à 0,5 fois le diamètre de la cavité antennaire (fig. 146) .... ***Birka* Malaise** (p. 92)

Tribe Strongylogastrini

Diagnosis. Adults of Strongylogastrini are distinguished from those of other tribe by the narrow median lobe of the mesoscutum and by the metepimeron, which is partly hairless.

Diversity. The tribe's range extends throughout Eurasia and North America. In North America three genera are known (Smith 1969*a*). In Canada two genera are recorded.

Genus *Hemitaxonus* Ashmead

Diagnosis. Adults of *Hemitaxonus* are distinguished from those of other North American genera of the tribe by the absence of both setae and pits on the median lobe of the mesoscutum.

Diversity. The genus consists of about 10 species found in Eurasia (most diverse in eastern Asia) and North America (Smith 1969*a*). In North America, including Canada, four species are known (Smith 1969*a*).

Host. Larvae feed on ferns: *Athyrium*, *Onoclea*, and *Matteuccia* (Smith 1969*a*; H. Goulet, unpublished observation).

Comments. Smith (1969*a*) revised the North American species of the genus.

Genus *Strongylogaster* Dahlbom

Diagnosis. Adults of *Strongylogaster* are distinguished from those of *Hemitaxonus* by the presence of setae at least near the anterolateral margin of the median lobe of the mesoscutum.

Diversity. The genus consists of about 30 species found in Eurasia and North America (Smith 1969*a*). In North America 11 species are known (Smith 1969*a*). In Canada 10 species are recorded.

Host. Larvae feed on ferns: *Dryopteris*, *Thelypteris*, *Gymnocarpium*, *Woodsia*, *Pteridium*, *Woodwardia*, and *Osmunda* (Benson 1952; Smith 1969*a*; H. Goulet, unpublished observation)

Comments. Smith (1969*a*) revised the North American species of the genus.

Tribe Aneugmenini

Diagnosis. Adults of Aneugmenini are distinguished from those of other tribes by the absence of the following: setae on the metepimeron, pits on the mesepimeron and mesoscutellum, an inverted V-shaped furrow on the mesepisternum, and a crossvein in the anal cell of the fore wing.

Diversity. The tribe is recorded in Eurasia, and North and South America (Smith 1969*a*). In North America five genera are known (Smith 1969*a*). In Canada three genera are reported.

Genus *Aneugmenus* Hartig

Diagnosis. Adults of *Aneugmenus* are distinguished from those of other North American genera of the tribe by the pitted mesoscutellum.

Diversity. The genus consists of about 12 species found in Eurasia and North America (Smith 1969*a*). In North America three species are known (Smith 1969*a*). In Canada two species are recorded.

Host. Larvae feed on ferns of the genus *Pteridium* and *Thelypteris* (Smith 1969*a*; H. Goulet, unpublished observation).

Comments. Smith (1969*a*) revised the North American species of the genus.

Genus *Birka* Malaise

Diagnosis. Adults of *Birka* are distinguished from those of other North American genera of the tribe by the absence of an occipital ridge along the posterior margin of the head in lateral view, by the black abdomen, and by the moderately wide malar space.

Diversity. The genus consists of about five species found mainly in Eurasia (Smith 1969*a*). In North America, including Canada, one species, *B. nordica* Smith, is known (Smith 1969*a*).

Host. Larvae of European species of the genus feed on sedges and grasses (Benson 1952).

Comments. Smith (1969*a*) characterized the single North American species of the genus.

Genus *Nesoselandria* Rohwer

Diagnosis. Adults of *Nesoselandria* are distinguished from those of other North American genera of the tribe by the absence of an occipital ridge along the posterior margin of the head in lateral view, by the black abdomen, and by the very short malar space.

Diversity. The genus consists of about 12 species found in North America and Eurasia (Smith 1969*a*) and is most diverse in eastern Asia (Smith 1969*a*). In North America, including Canada, one species, *N. morio* (Fabricius), is known (Smith 1969*a*).

Host. T. Naito (personal communication) found larvae feeding on mosses. V. Vickberg (personal communication) confirmed this observation.

Comments. Smith (1969*a*) characterized the single species of the genus.

Tribe Selandriini

Diversity. Selandriini consists of two genera found in Eurasia and North America (Smith 1969*a*). In North America, including Canada, one genus is known (Smith 1969*a*).

Genus *Brachythops* Haliday

Diagnosis. Adults of *Brachythops* are distinguished from those of other North American genera of the subfamily by the inverted V-shaped furrow near the dorsal angle of the mesepisternum.

Diversity. The genus consists of two species, both found in Eurasia and North America (Smith 1969*a*).

Host. Larvae feed on sedges (Smith 1969*a*).

Comments. Smith (1969*a*) revised the species of the genus.

Tribe Adelestini

Diversity. Adelestini consists of one genus, *Adelesta*, found in eastern North America (Smith 1969*a*).

Genus *Adelesta* Ross

Diagnosis. Adults of *Adelesta* are distinguished from those of other genera of the subfamily by the presence of 7 flagellomeres and by the anal crossvein in the fore wing near the middle of the cell.

Diversity. The genus consists of one species, *A. nova* (Norton) (Smith 1969*a*).

Comments. Smith (1969*a*) characterized the single species of the genus.

Tribe Heptamelini

Diversity. Heptamelini consists of one genus (Smith 1969*a*).

Genus *Heptamelus* Hartig

Diagnosis. Adults of *Heptamelus* are distinguished from those of other genera of the subfamily by veins M and cu-a of the fore wing, which are joined at their origin, and by the flagellum which has 5 or 6 flagellomeres.

Diversity. The genus consists of five or six species found in Eurasia and North America (Smith 1969). In North America, including Canada, one introduced species, *H. ochroleucus* (Stephens), is known (Smith 1969*a*).

Host. Larvae bore in stems of ferns: *Athyrium*, *Blechnum*, and *Polypodium* (Benson 1952).

Comments. Smith (1969*a*) characterized the single North American species of the genus.

Tribe Dolerini

Diagnosis. Adults of Dolerini are distinguished from those of other North American genera of the subfamily by the absence of vein 2r-m in the fore wing and by presence of the punctate lateral lobe of the mesoscutum and the punctate dorsal surface of the head.

Diversity. The tribe consists of two genera and over 180 species (Benson 1952; Goulet 1986). The range of most species extends over temperate and boreal regions of Eurasia and North America, but one species is known from high mountains of eastern Africa (Benson 1952). In North America two genera and 73 species are known (Goulet 1986). In Canada one genus and 51 species are recorded, but 60 species are expected.

Genus *Dolerus* Panzer

Diagnosis. Adults of the genus *Dolerus* are distinguished from those of *Prionourgus* Goulet (a genus not recorded from Canada) by the minimal malar space, which is more than one-third of the diameter of the antennal socket, and by the apical margin of the clypeus, which is clearly concave.

Diversity. Except for *P. salmani* (Ross) all other Dolerini belong to the genus *Dolerus* (see Dolerini).

Comments. Goulet (1986) revised the North American species of the tribe.

Dolerus nitens group

Diagnosis. Adults of the *Dolerus nitens* group are distinguished from those of other subgenera of *Dolerus* by the combination of characters in the key.

Diversity. The group consists of over 30 species found in Eurasia and North America (Goulet 1986). The group is most diverse in Eurasia (Goulet 1986). In North America, including Canada, nine species are recorded (Goulet 1986).

Host. Larvae of many European species are known to feed on species of various genera of grasses (Benson 1952).

Comments. See genus *Dolerus*.

Subgenus *Neodolerus* Goulet

Diagnosis. Adults of *Neodolerus* are distinguished from those of other subgenera of *Dolerus* by the deep furrow on the outer surface of the hind tibia and by the large flat surface on the posterior third of the median lobe of the mesoscutum.

Diversity. The subgenus consists of 11 species restricted to North America (Goulet 1986). In Canada eight species are recorded.

Host. Larvae of one species, *D. sericeus* Say, feed on wheat (D.R. Smith, personal communication).

Comments. See genus *Dolerus*.

Subgenus *Achaetoprion* Goulet

Diagnosis. Adults of *Achaetoprion* are distinguished from those of other subgenera by the combination of characters in the key.

Diversity. The genus consists of over 36 species found in Eurasia and North America (Goulet 1986). The genus is most diverse in North America, where 32 species are known (Goulet 1986). In Canada 17 species are known, but 22 are expected.

Host. Larvae of European species feed on *Juncus* (Benson 1952).

Comments. See genus *Dolerus*.

Subgenus *Oncodolerus* Goulet

Diagnosis. Adults of *Oncodolerus* are distinguished from those of other subgenera of *Dolerus* by the long eyes with the inner margin clearly concave, by a hook-like process at the apex of valvula 3 in lateral view in the female, and by a membranous zone at the midline part of terga 5 and 6 in the male.

Diversity. The subgenus consists of at least three species found in Eurasia and North America (Goulet 1986). In North America, including Canada, the subgenus consists of only one species, *D. acidus* (MacGillivray) (Goulet 1986).

Host. Larvae feed on horsetails (Benson 1952; L. Leblanc, personal communication).

Comments. See genus *Dolerus*.

Subgenus *Loderus* Konow

Diagnosis. Adults of *Loderus* are distinguished from those of other subgenera by the long eyes with the inner margin clearly concave, by the pits of the mesepisternum, which are hardly outlined, and by the smooth and hairless ventral part of the mesepisternum.

Diversity. The subgenus consists of two species found across Eurasia and North America (Goulet 1986). In North America, including Canada, one species, *D. gilvipes albifrons* (Norton), is recorded (Goulet 1986).

Host. Larvae feed on horsetails (Benson 1952; L. Leblanc, personal communication).

Comments. See genus *Dolerus*.

Subgenus *Dicrodolerus* Goulet

Diagnosis. Adults of *Dicrodolerus* are distinguished from those of other subgenera of *Dolerus* by the long eyes with the inner margin clearly concave and by the deeply pitted mesepisternum.

Diversity. The subgenus consists of at least five species found in Eurasia and North America (Goulet 1986). In North America, inluding Canada, two species are known (Goulet 1986).

Host. Larvae feed on horsetails (Benson 1952; L. Leblanc, personal communication).

Comments. See genus *Dolerus*.

Subgenus *Dolerus* Panzer

Diagnosis. Adults of the subgenus *Dolerus* are distinguished from those of other subgenera by the combination of characters in the key.

Diversity. The subgenus consists of more than 30 species found in Eurasia and North America (Goulet 1986). In North America 12 species are known (Goulet 1986). In Canada 10 species are known.

Host. Larvae feed on horsetails (Benson 1952; L. Leblanc, personal communication).

Comments. See genus *Dolerus*.

Subgenus *Dosytheus* Leach

Diagnosis. Adults of *Dosytheus* are distinguished from those of other subgenera by the straight inner margin of the eyes, by the black setae at the apex of valvula 3 in females, and by the long postocellar area and sternum 9 in males.

Diversity. The subgenus consists of at least five species found in Eurasia and North America (Goulet 1986). In North America, including Canada, four species are known (Goulet 1986).

Host. Larvae feed on horsetails (Benson 1952).

Comments. See genus *Dolerus*.

Subfamily Susaninae

Diagnosis. Adults of Susaninae are distinguished from those of other subfamilies of Tenthredinidae by the convergent fore wing veins M and 1m-cu, by the incompletely outlined fore wing veins 2A and 3A, by the marked distance between junctions of vein Sc with veins M and Rs+M, and by the absence of an epicnemial furrow.

Diversity. The subfamily consists of one genus, *Susana*, found in North America (Smith 1969*b*).

Genus *Susana* Rohwer and Middleton

Diversity. *Susana* consists of seven species restricted to western North America (Smith 1969*b*; Wong and Milliron 1972). In Canada one species is known, but two are expected.

Host. Larvae feed on cypresses and junipers (Smith 1969*b*; Wong and Milliron 1972).

Comments. Smith (1969*b*) revised the genus, and Wong and Milliron (1972) described an additional species.

Subfamily Nematinae

Diagnosis. Adults of Nematinae with the clearly convergent fore wing veins M and 1m-cu are distinguished from those of other subfamilies of Tenthredinidae by the combination of characters in the key.

Diversity. The subfamily consists of over 35 genera (Benson 1958), which are almost entirely restricted to Eurasia and North America, except for very few species from Borneo and South America (Wong and Benson 1965).

Key to tribes, genera, and subgenera of Nematinae

1 Length of fore wing shorter than that of abdomen .... Nematini (few taxa) 25

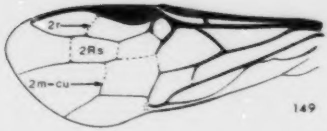
Length of fore wing longer than that of abdomen 2

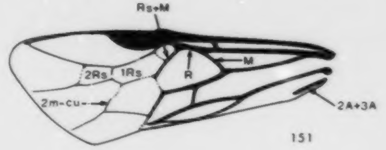
2(1) Vein 2m-cu of fore wing joined to cell 2Rs (Fig. 149) 3

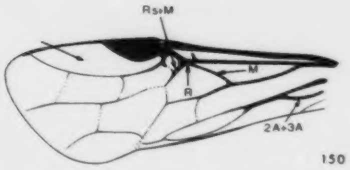
Vein 2m-cu of fore wing joined to cell 1Rs (Fig. 151) or joined to cell 2Rs very close to vein 2r-m (a few aberrant specimens) 7

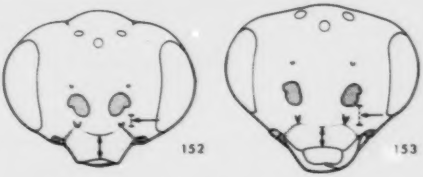
3(2) Length of vein R in the fore wing between junctions with veins M and Rs+M long (Fig. 151). Combined length of scape and pedicel 0.7 times as long as or longer than flagellomere 1 (Fig. 157). Male and female flagellum similar: thread-like, with short pubescence (Fig. 157) .... Nematini (part) 4

Length of vein R in the fore wing between junctions with veins M and Rs+M short (Fig. 150). Combined length of scape and pedicel 0.5 times as long as or shorter than flagellomere 1 (Figs. 154–156). Male and female flagellum dissimilar: seta-like, with short pubescence in female (Fig. 156), and seta-, saw- or comb-like, with long pubescence in male .... Cladiini 5


2r
2Rs
2m-cu
149

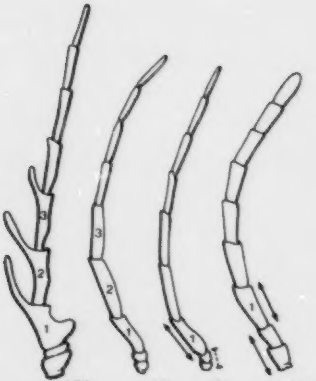

Rs+M
M
2Rs
1Rs
R
2m-cu
2A+3A
151


Rs+M
M
R
2A+3A
150



Figs. 149–151. Fore wing. 149, *Hoplocampa halcyon* (Norton); 150, *Trichiocampus viminalis* (Fallén); 151, *Pristiphora erichsonii* (Hartig).

Figs. 152, 153. Frontal view of head. 152, *Trichiocampus simplicicornis* (Norton); 153, *Priophorus morio* (Lepeletier).


3
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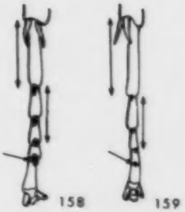
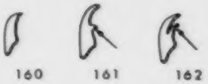
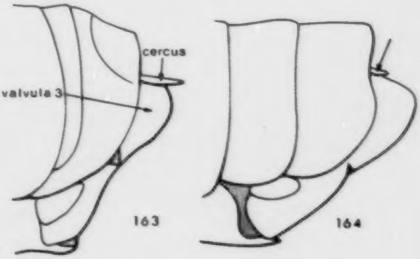





cercus
valvula 3
163
164

Figs. 154–157. Antenna. 154, male of *Cladius difformis* (Panzer); 155, male of *Priophorus morio* (Lepeletier); 156, female of *Priophorus pallipes* (Lepeletier); 157, female of *Hoplocampa halcyon* (Norton).

Figs. 158, 159. Ventral view of metatarsus. 158, *Trichiocampus simplicicornis* (Norton); 159, *P. morio*.

Figs. 160–162. Tarsal claw. 160, *Neopareophora litura* (Klug); 161, *Hoplocampa testudinea* (Klug); 162, *Caulocampus matthewsi* Smith.

Figs. 163, 164. Cercus and valvula 3. 163, *P. morio*; 164, *Cladius difformis*.

4(3) Vein 2r of fore wing absent (Fig. 150). Membranous area between terga 1 and 2 small: tergum 1 wide near midline. Postocellar furrow pit-like and small. Inner tooth of claw long and slender (Fig. 162) .... ***Caulocampus*** **Rohwer** (p. 121)

Vein 2r of fore wing developed (Fig. 149). Membranous area between terga 1 and 2 large: tergum 1 narrow near middle. Postocellar furrow linear, though short. Inner tooth of claw absent, small, or long and stout (Figs. 160, 161) .... ***Hoplocampa*** **Hartig** (p. 121)

5(3) Pulvillus of tarsomeres 1–4 as wide as base of tarsomere (best seen on tarsomere 4) (Fig. 158). Metatarsomere 1 as long as metatarsomeres 2 and 3 combined (Fig. 158). Clypeus long: medial length longer than shortest distance between antennal socket and clypeus (Fig. 152) .... ***Trichiocampus*** **Hartig** (p. 120)

Pulvillus of tarsomeres 1–4 clearly narrower than base of tarsomere (Fig. 159). Metatarsomere 1 as long as or longer than that of 2–4 (Fig. 159). Clypeus short: medial length as short as or shorter than shortest distance between antennal socket and clypeus (Fig. 153) 6

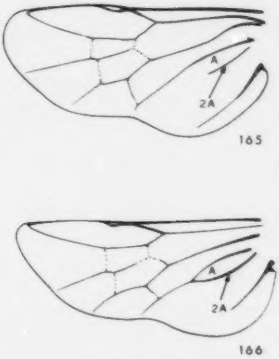
6(5) Flagellomere 1 in female three times or less as long as wide and concave along ventral margin. Cercus in female as long as length of dorsal margin of valvula 3 in lateral view (Fig. 163). Flagellomeres 1–3 in male extended at dorsoanterior angle into comb-like structure (Fig. 154) .... ***Cladius*** **Illiger** (p. 120)

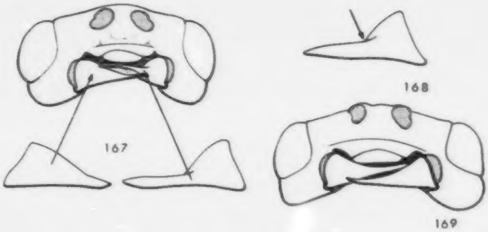
Flagellomere 1 in female four times (or more) as long as wide and straight along ventral margin. Cercus in female 0.5 as long as length of dorsal margin of valvula 3 in lateral view (Fig. 164). Flagellomeres 1–3 in male not extended at dorsoanterior angle into comb-like structure (Fig. 155) .... ***Priophorus*** **Dahlbom** (p. 120)

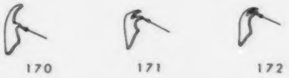
7(2) Vein 2A of hind wing incompletely developed, thus cell open (Fig. 165). (Body 4–5 mm in length) .... Pseudodineurini 8

Vein 2A of hind wing completely developed, thus cell closed (Fig. 166) 9

8(7) Postocular surface in lateral view pitted, sculptured, and dull. Minimum malar space one-third, or less, diameter of antennal socket .... ***Pseudodineura*** **Konow** (p. 132)



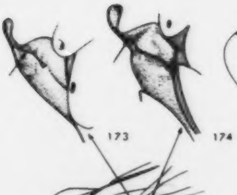


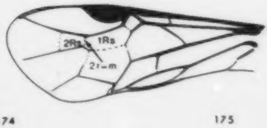


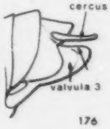
Figs. 165, 166. Hind wing. 165, *Anoplonyx laricivorus* (Rohwer & Middleton); 166, *Pseudodineura parva* (Norton).
Figs. 167–169. Ventral view of head: (*a*), complete view (*b*), right mandible (*c*), left mandible. 167, *Nematus* sp.; 168, *Amauronematus* sp.; 169, *Hemichroa crocea* (Geoffroy).
Figs. 170–172. Tarsal claw. 170, *Hoplocampa testudinea* (Klug); 171, *Nematus* sp.; 172, *Euura* sp.

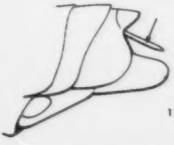
Postocular surface in lateral view not pitted but smooth and bright. Minimum malar space half, or less, diameter of antennal socket .... ***Kerita* Ross** (p. 132)

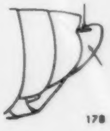
9(7) Outer surface of mandibles similar: both tapered regularly to apex (Fig. 169) .... Nematini (part) 10

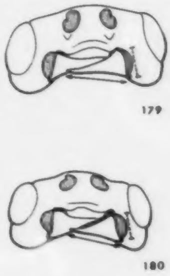












Figs. 173, 174. Metapleuron. 173, *Anoplonyx laricivorus* (Rohwer & Middleton); 174, *Nematus* sp.
Fig. 175. Fore wing of *Nematus ribesii* (Scopoli).
Figs. 176–178. Cercus and valvula 3, lateral view. 176, *Euura (Euura)* sp.; 177, *Pontania* sp.; 178, *Euura (Gemmura)* sp.
Figs. 179, 180. Ventral view of head. 179, *Pontania* sp.; 180, *Euura* sp.

Outer surface of mandibles dissimilar: left mandible markedly constricted near middle (Figs. 167, 168) 19

10(9) Base of vein 2A and 3A of fore wing atrophied and straight (Fig. 151), and inner tooth of claw long and slender (Figs. 171, 172). Metepimero-episternal suture close to membranous surface for half its length (Fig. 174) 11

Base of vein 2A and 3A of fore wing complete and curved up to 1A (Fig. 150) or incomplete and inner tooth of claw short and stout (Fig. 170). Metepimero-episternal suture distant from membranous surface (Fig. 173) 14

11(10) Outer surface of mandibles 1.5 times wider than long (Fig. 180). Cell 1Rs and 2Rs in fore wing fused because vein 2r-m missing. Cercus in female about six times longer than wide and usually longer than length of dorsal margin of valvula 3 in lateral view (Figs. 176, 177) .... ***Euura*** **Newman** 12

Outer surface of mandibles about twice as wide as long (Fig. 179). Cell 1Rs and 2Rs of fore wing usually divided by vein 2r-m (Fig. 175). Cercus in female three to five times longer than wide and as long as or shorter than length of dorsal margin of valvula 3 in lateral view (Fig. 178) .... ***Pontania*** **(*Eupontania*) Zinovjev** (p. 129)

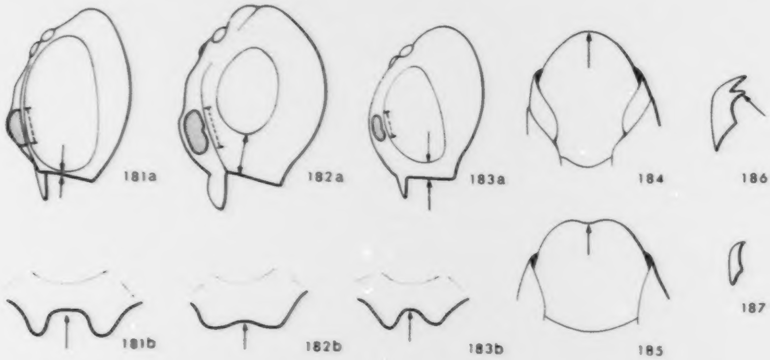
12(11) Male .... ***Euura*** **(*Euura*) Newman** or ***Euura*** **(*Gemmura*) Smith** (p. 130)

Female 13

13(12) Valvula 3 short: height subequal to length in lateral view (Fig. 176). Cercus usually as long as the length of dorsal margin of valvula 3 in lateral view (Fig. 176) .... ***Euura*** **(*Gemmura*) Smith** (p. 130)

Valvula 3 long: height shorter than length in lateral view (Fig. 177). Cercus shorter than length of dorsal margin of valvula 3 in lateral view (Fig. 177) .... ***Euura*** **(*Euura*) Newman** (p. 130)

14(10) Clypeus widely and deeply emarginate (Fig. 181*b*). Minimum malar space one-quarter of diameter of antennal socket (Fig. 181a). Anterior half of mesepimeron partly or completely covered with setae .... ***Craterocercus*** **Rohwer** (p. 123)



Figs. 181–183. Lateral view of head (*a*), clypeus (*b*). 181, *Craterocerus obtusus* (Klug); 182, *Fallocampus albostigmus* (Rohwer); 183, *Hemichroa militaris* (Cresson).
Figs. 184, 185. Sternum 9 of male. 184, *Anoplonyx laricivorus* (Rohwer & Middleton); 185, *Nematinus ochreatus* (Rohwer).
Figs. 186, 187. Tarsal claw. 186, *H. crocea* (Geoffroy); 187 *Neopareophora litura* (Klug).

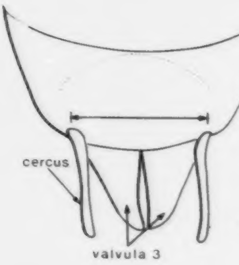
Clypeus shallowly (Fig. 182*b*) or deeply and narrowly emarginate (Fig. 183*b*). Minimum malar space more than half of diameter of antennal socket (Figs. 182*a*, 183*a*). Anterior half of mesepimeron without setae 15

15(14) Tarsal claw without inner tooth (Fig. 187). Clypeus three times wider than long. Cercus in female two to four times longer than wide. Last sternum in male evenly convex on posterior margin (Fig. 184) .... ***Anoplonyx*** **Marlatt** (p. 124)

Tarsal claw with well-developed inner tooth (Fig. 186). Clypeus twice as wide as long. Cercus in female 3–20 times longer than wide. Last sternum in male slightly concave on posterior margin at middle (Fig. 185) 16

16(15) Pulvillus long: distance between pulvilli of metarsomeres 1 and 2 subequal to their length (Fig. 191). Flagellomere 1 longer than 3 .... ***Fallocampus*** **Wong** (p. 123)

Pulvillus short: distance between pulvilli of metatarsomeres 1 and 2 about twice their length (Fig. 190). Flagellomere 1 about as long as 3 17



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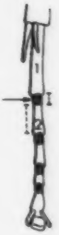

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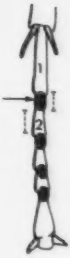

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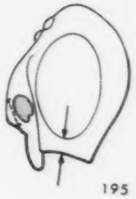

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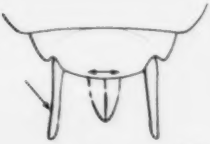

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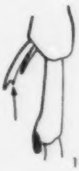

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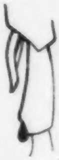

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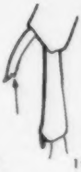

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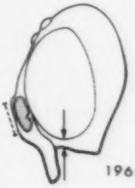

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Figs. 188, 189. Cerci and valvulae 3, dorsal view. 188, *Nematinus ochreatus* (Rohwer); 189, *Hemichroa militaris* (Cresson).

Figs 190, 191. Lateral view of metatarsus. 190, *H. militaris*; 191, *Fallocampus albostigmus* (Rohwer).

Figs. 192–194. Spurs of protibia. 192, *N. ochreatus*; 193, *H. militaris*; 194, *H. (Hemichroa) crocea* (Geoffroy).

Figs. 195, 196. Lateral view of head. 195, *N. ochreatus*; 196, *H. crocea*.

17(16) Female: cercus about 10 times longer than wide (Fig. 188); valvula 3 in dorsal view very wide at base: about twice as wide as greatest width of metatibia (Fig. 188). Male: vein 2A and 3A of fore wing incomplete and straight (Fig. 151); largest spur at apex of protibia with blade-like inner tooth (Fig. 192) and minimum malar space about 0.6 of diameter of antennal socket (Fig. 195) .... ***Nematinus*** **Rohwer** (p. 125)

Female: cercus 3–6 times longer than wide (Fig. 189); valvula 3 in dorsal view narrow at base: about 0.7 of greatest width of metatibia (Fig. 189). Male: vein 2A and 3A complete (Fig. 150), incomplete and curved upward, or incomplete and straight; largest spur at apex of protibia without blade-like inner tooth (Fig. 193), or, if present, (Fig. 194) then minimum malar space less than 0.4 times of diameter of antennal socket (Fig. 196) .... ***Hemichroa*** **Stephens** 18

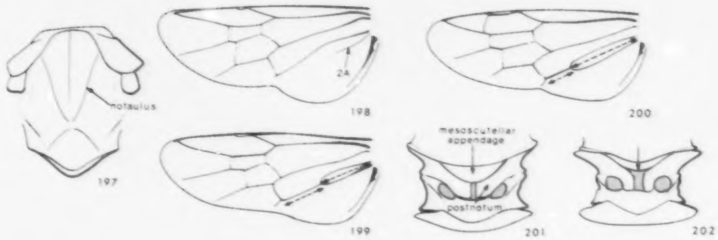


Fig. 197. Mesonotum of *Nematus erythrogaster* Norton.
Figs. 198–200. Hind wing. 198, *Pseudodineura parva* (Norton); 199, *Anoplonyx laricivorus* (Rohwer and Middleton); 200, *Adelomos cleone* Ross (modified from Ross 1937).
Figs. 201, 202. Mesoscutellar appendage. 201, *N. latifasciatus* (Cresson); 202, *Pristola macnabi* Ross.

18(17) Largest spur at apex of protibia with blade-like inner tooth (Fig. 194..... ***Hemichroa* (*Hemichroa*) Stephens** (p. 122)

Largest spur at apex of protibia without bladelike inner tooth (Fig. 193) .... ***Hemichroa* (*Varna*) Ross** (p. 122)

19(9) Notauli hardly outlined in anterior half. Posterior margin of mesoscutellar appendage touching membrane between it and postnotum of mesothorax (Fig. 202). Tarsal claw without inner tooth .... Pristolini 20

Notauli sharply outlined at least in anterior half (Fig. 197). Posterior margin of mesoscutellar appendage clearly above membrane between it and postnotum of mesothorax (Fig. 201). Tarsal claw with or without (few species of *Pristiphora* and *Neopareophora liturata*) inner tooth .... Nematini (part) 21

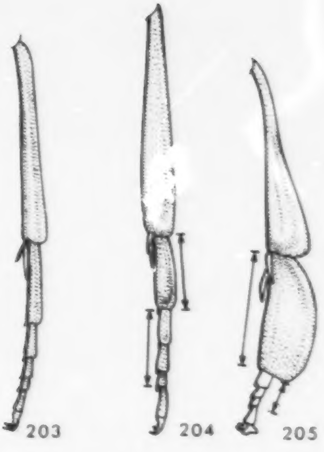
20(19) Vein 2A of hind wing incomplete (Fig. 198) or complete and anal cell longer than vein at apex of anal cell (Fig. 200) .... ***Pristola* Ross** (p. 133)

Vein 2A of hind wing complete and anal cell at most as long as vein at apex of anal cell (Fig. 199) .... ***Melastola* Wong** (p. 133)

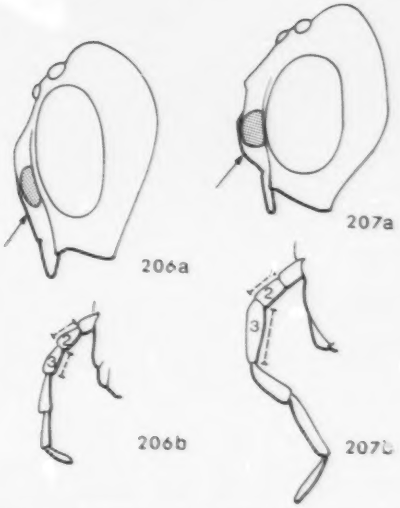
21(19) Vein 2r of fore wing developed (Fig. 149) 22

Vein 2r of fore wing absent 23

22(21) Tarsal claw without inner tooth (Fig. 160). Vein r of hind wing absent .... ***Neopareophora* MacGillivray** (p. 124)



Figs. 203–205. Metatibia and metatarsus, lateral view. 203, *Nematus erythrogaster* Norton; 204, *N. abbotii* Kirby; 205, *Croesus latitarsus* Norton.



Figs. 206, 207. Lateral view of head (*a*), right maxillary palp (*b*), 206, *Amauronematus fallax* (Lepeletier); 207, *Nematus* sp.

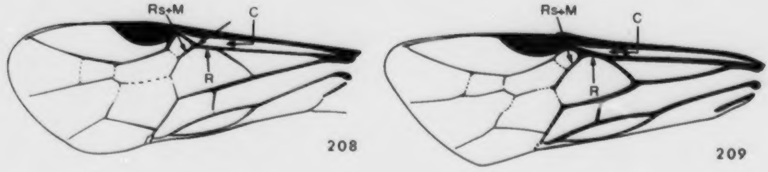
Tarsal claw with large inner tooth (Fig. 162). Vein r of hind wing developed or absent (Fig. 200) .... ***Adelomos* Ross** (p. 124)

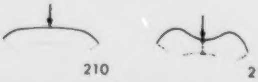
23(21) Metatibia and metatarsomeres (especially first one) markedly flattened and deeply grooved laterally (Figs. 204, 205) 24

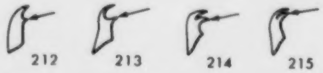
Metatibia and metatarsomeres slightly or not flattened and slightly or not grooved laterally (Fig. 203) 25

24(23) Apex of metatibia and metatarsomere 1 extremely flattened (Fig. 205). Metatarsomere 1 longer than combined length of remaining tarsomeres (Fig. 205) .... ***Croesus* Leach** (p. 127)

Apex of metatibia and metatarsomere 1 much less flattened than above (Fig. 204). Metatarsomere 1 as long as combined tarsomeres 2, 3, and 4 (Fig. 204) .... ***Nematus* Panzer** (few taxa; p. 128)







Figs. 208, 209. Fore wing. 208, *Nematus ribesii* (Scopoli); 209, *Pristiphora erichsonii* (Hartig).

Figs. 210, 211. Clypeus. 210, *P. cincta* Newman; 211, *Nematus* sp.

Figs. 212–215. Tarsal claw. 212, *Pachynematus* sp.; 213, *Eitelius gregarius* (Marlatt); 214, *Nematus* sp.; 215, *Euura* sp.

25(23) Medial surface of head near antennal sockets little elevated in lateral view and little or not angular below median pit (Fig. 206*a*). Maxillary palpomeres 2 long: 0.7–1.0 that of 3 (Fig. 206*b*). (Cenchri as far apart as their maximum width. Length of smallest apical spur of metatibia 0.8–1.0 that of longest one; length of longest apical spur of metatibia usually less than 0.5 that of metatarsomere 1) 26

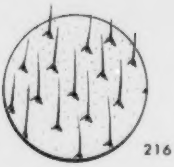
Medial surface of head near antennal sockets markedly elevated in lateral view and angular below medial pit (Fig. 207*a*). Maxillary palpomere 2 short: 0.5–0.7 that of 3 (Fig. 207*b*) 28

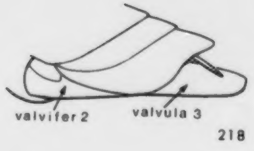
26(25) Minimum malar space twice the diameter, or more, of median ocellus 27

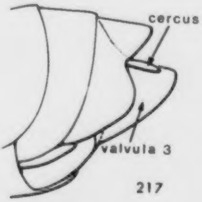
Minimum malar space 1–1.5 times the diameter of median ocellus ....
.... ***Amauronematus* (*Pontopristia*) Malaise** (p. 131)

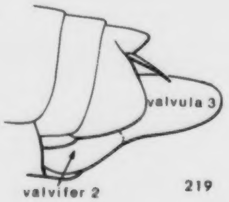
27(26) Flagellum seta-like as apical flagellomeres markedly narrower than basal ones. Adjacent valvula 3 in dorsal view with apex sharp ....
..... ***Amauronematus* (*Amauronematus*) Konow** (p. 131)

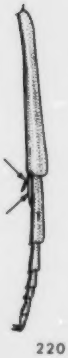
Flagellum thread-like because apical flagellomeres hardly narrower than basal ones. Adjacent valvula 3 in dorsal view with apex indented ....
.... ***Amauronematus* (*Decanematus*) Malaise** (p. 131)

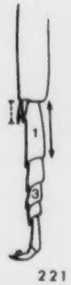












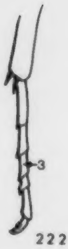
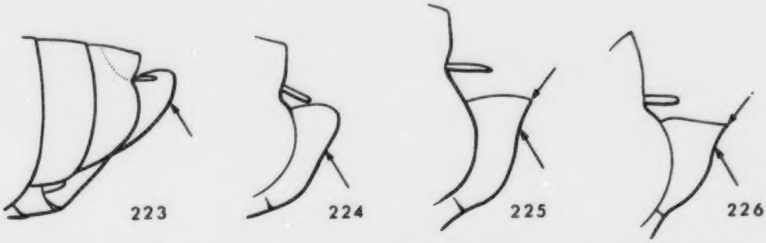


Fig. 216. Setae between eye and lateral ocellus of *Pachynematus* sp.
Figs. 217–219. Cercus, valvifer 2 and valvula 3. 217, *Pachynematus* sp.; 218, *Decanematus dulichus* Wong; 219, *Pikonema alaskensis* (Rohwer).
Figs. 220–222. Lateral view of metatarsus. 220, *Nematus erythrogaster* Norton; 221, *Phyllocolpa bozemanni* (Cooley); 222, *Pontania* sp.

28(25) Vein C of fore wing swollen near apex and cell C horn-like and not angular at junction of Rs+M and R; cell C about half as wide as that of vein C at level of junction of Rs+M and R (Fig. 209). Anterior margin of clypeus usually straight or slightly concave: depth of concavity smaller than half of medial length of clypeus (Fig. 210). Flagellomere 1 in male with some stiff and usually black setae on dorsal half (with dark surface, best seen along the dorsal margin against a well-lit background). Apex of valvula 3 in dorsal view emarginated or acute. (Tarsal claw without or with an inner tooth; inner tooth when present rarely long and slender. Cenchri usually small: maximum width 0.5–0.7 of distance between cenchri) .... ***Pristiphora* Latreille** (p. 127)

Vein C of fore wing slightly swollen near apex and cell C not horn-like but angular at junction of Rs+M and R; cell C about as wide as that of vein C at level of junction of Rs+M and R (Fig. 208). Anterior margin of clypeus concave: depth of concavity 0.5–0.7 of medial length of clypeus (Fig. 211). Flagellomere 1 in male without stiff setae; setae of similar shape and length. Apex of valvula 3 in dorsal view acute 29



Figs. 223–226. Valvula 3. 223, ***Pontania*** **sp.; 224,** ***Pontania*** **sp.; 225,** ***Phyllocolpa puella*** **(Thomson); 226,** ***Phyllocolpa leucosticta*** **(Hartig).**

29(28) **Inner tooth of tarsal claw short or long but distant from tooth at apex (Figs. 212, 213) 30**

Inner tooth of tarsal claw long and close to tooth at apex (Figs. 214, 215) 33

30(29) **Margin between inner and outer teeth of tarsal claw regularly curved (Fig. 213) ....** ***Eitelius*** **Kontuniemi (p. 126)**

Margin between inner and outer teeth of tarsal claw angular (Fig. 212) 31

31(30) **Seta-bearing pits of head raised above surface (best seen between eyes and lateral ocellus) (Fig. 216). Dorsal margin of valvula 3 in female as long as or slightly shorter than cercus (Fig. 217). Setae of flagellomeres in male 30–35 mm in length ....** ***Pachynematus*** **Konow (p. 125)**

Seta-bearing pits of head not or obscurely outlined, not raised above surface. Dorsal margin of valvula 3 in female almost twice as long as cercus (Fig. 219). Setae of flagellomeres in male 50 µm in length 32

32(31) **Female only (no males known). Combined length of valvifer 2 and valvula 3 as long as that of abdomen (Fig. 218). Dorsal and ventral margin of valvula 3 almost straight in lateral view (Fig. 218) ....** ***Decanematus dulichus*** **Wong***

Male or female. Combined length of valvifer 2 and valvula 3 about half that of abdomen (Fig. 219). Dorsal and ventral margin of valvula 3 curved in lateral view (Fig. 219) .... ***Pikonema*** **Ross (p. 126)**

*** See section entitled "Diversity," under subgenus** ***Decanematus*** **(p. 131).**

33(30) Spurs at apex of metatibia clearly unequal: length of outer spur 0.7 or less that of inner one (Fig. 220). Longest spur at apex of metatibia half as long as that of metarsomere 1 (Fig. 220). Body longer than 5 mm. Flagellum long: flagellomere 1 in female 3.5 times, or in male 3 times, as long as wide. Flagellum seta-like in males and females (Figs. 155, 156) .... ***Nematus*** **Rohwer** (most taxa; p. 128)

Spurs at apex of metatibia more similar in length than above: length of outer spur 0.75–0.9 that of inner one (Fig. 221). Longest spur at apex of metatibia 0.3 (usually) to 0.5 that of metatarsomere 1 (Fig. 221). Body length less than 5 mm. Flagellum short: flagellomere 1 in female 2–3.5 times, or in male 2–2.5 times, as long as wide. Flagellum thread-like in female (Fig. 157) and thread- or seta-like in males 34

34(33) Apex of valvula 3 in lateral view apex acute (Figs. 225–226). Metatarsomere 3 usually less than twice as long as wide in lateral view (Fig. 221). Flagellum usually long: flagellomere 1 in female 3.5 times, or in male 2.5 times, as long as wide .... ***Phyllocolpa*** **Benson** (p. 129)

Apex of valvula 3 in lateral view rounded (Fig. 223–224). Metatarsomere 3 usually twice to three times as long as wide in lateral view (Fig. 222). Flagellum short: flagellomere 1 in female three times, or in male 2.5 times, as long as wide .... ***Pontania (Pontania)*** **Costa** (p. 128)

Clé des tribus, des genres et des sous-genres de Nematinae

1 Aile antérieure moins longue que l'abdomen .... Nematini (peu de taxa) 25

Aile antérieure plus longue que l'abdomen 2

2(1) Nervure 2m-cu de l'aile antérieure reliée à la cellule 2Rs (fig. 149) 3

Nervure 2m-cu de l'aile antérieure reliée à la cellule 1Rs (fig. 151) ou à la cellule 2Rs très près de la nervure 2r-m (quelques spécimens aberrants) 7

3(2) Dans l'aile antérieure, partie de la nervure R située entre les jonctions avec les nervures M et Rs+M, longue (fig. 151). Longueur du scape et du pédicelle combinés égale à au moins 0,7 fois la longueur de l'article 1 du flagelle (fig. 157). Flagelle du mâle semblable à celui de la femelle : filiforme, pourvu de poils courts (fig. 157) .... Nematini (en partie) 4

Dans l'aile antérieure, partie de la nervure R située entre les jonctions avec les nervures M et Rs+M, courte (fig. 150). Longueur du scape et du pédicelle combinés égale à au plus 0,5 fois la longueur de l'article 1 du flagelle (fig. 154 à 156). Flagelle du mâle différent de celui de la femelle : en forme de soie et pourvu de poils courts chez la femelle (fig. 156) ; en forme de soie, de scie ou de peigne et pourvu de poils longs chez le mâle .... Cladiini 5

4(3) Nervure 2r de l'aile antérieure absente (fig. 150). Petite surface membraneuse entre les terga 1 et 2 : tergum 1 large près de la ligne médiane. Sillon postocellaire petit et en forme de fosse. Dent interne de la griffe longue et mince (fig. 162) .... ***Caulocampus*** **Rohwer** (p. 121)

Nervure 2r de l'aile antérieure présente (fig. 149). Grande surface membraneuse entre les terga 1 et 2 : tergum 1 étroit près de la ligne médiane. Sillon postocellaire linéaire bien que court. Dent interne de la griffe absente, petite, ou longue et forte (fig.160, 161) .... ***Hoplocampa*** **Hartig** (p. 121)

5(3) Pulville des articles 1 à 4 du tarse aussi large que la base de l'article (plus évident sur l'article 4) (fig. 158). Article 1 du métatarse aussi long que les articles 2 et 3 combinés (fig. 158). Clypéus long : longueur médiane supérieure à la distance la plus courte entre la cavité antennaire et le clypéus (fig. 152) .... ***Trichiocampus*** **Hartig** (p. 120)

Pulville des articles 1 à 4 du tarse nettement plus étroit que la base de l'article (fig. 159). Article 1 du métatarse aussi long ou plus long que les articles 2 à 4 combinés (fig. 159). Clypéus court : longueur médiane aussi courte ou plus courte que la distance minimale entre la cavité antennaire et le clypéus (fig. 153) 6

6(5) Article 1 du flagelle de la femelle au plus trois fois plus long que large et concave le long du bord ventral. En vue latérale, cerque de la femelle de même longeur que le bord dorsal de la valvule 3 (fig. 163). Articles 1 à 3 du flagelle du mâle s'étendant à l'angle dorsal antérieur en une structure en forme de peigne (fig. 154) .... ***Cladius*** **Illiger** (p. 120)

Article 1 du flagelle de la femelle au moins quatre fois plus long que large et rectiligne le long du bord ventral. En vue latérale, cerque de la femelle 0,5 fois la longueur du bord dorsal de la valvule 3 (fig. 164). Articles 1 à 3 du flagelle du mâle ne s'étendant pas à l'angle dorsal antérieur en une structure en forme de peigne (fig. 155) .... ***Priophorus*** **Dahlbom** (p. 120)

7(2) Nervure 2A de l'aile postérieure incomplète, formant ainsi une cellule ouverte (fig. 165) (Corps mesurant de 4 à 5 mm de long) .... Pseudodineurini 8

Nervure 2A de l'aile postérieure complète, formant ainsi une cellule fermée (fig. 166) 9

8(7) En vue latérale, surface postoculaire ponctuée, sculptée et terne. Surface malaire minimale égale ou inférieure au tiers du diamètre de la cavité antennaire .... ***Pseudodineura*** **Konow** (p. 132)

En vue latérale, surface postoculaire non ponctuée mais lisse et brillante. Surface malaire minimale égale ou inférieure à la moitié du diamètre de la cavité antennaire .... ***Kerita*** **Ross** (p. 132)

9(7) Surfaces externes des mandibules semblables : toutes deux aplaties de façon régulière vers l'apex (fig. 169) .... Nematini (une partie) 10

Surfaces externes des mandibules différentes : mandibule gauche fortement étranglée près du milieu (fig. 167, 168) 19

10(9) Base des nervures 2A et 3A de l'aile antérieure atrophiée et rectiligne (fig. 151) et dent interne de la griffe longue et mince (fig. 171, 172). Suture métépiméro-épisternale près de la surface membraneuse sur la moitié de sa longueur (fig. 174) 11

Base des nervures 2A et 3A de l'aile antérieure complète et courbée jusqu'à la nervure 1A (fig. 150) ou incomplète, et dent interne de la griffe courte et forte (fig. 170). Suture métépiméro-épisternale éloignée de la surface de la membrane (fig. 173) 14

11(10) Surface externe des mandibules 1,5 fois plus large que longue (fig. 180). Cellules 1Rs et 2Rs de l'aile antérieure fusionnées à cause de l'absence de la nervure 2r-m. Cerque de la femelle environ 6 fois plus long que large et généralement plus long que le bord dorsal de la valvule 3 en vue latérale (fig. 176, 177) .... ***Euura* Newman** 12

Surface externe des mandibules longues environ deux fois plus large que longue (fig. 179). Cellules 1Rs et 2Rs de l'aile antérieure généralement séparées par la nervure 2r-m (fig. 175). Cerque de la femelle trois à cinq fois plus long que large et aussi long ou plus court que le bord dorsal de la valvule 3 en vue latérale (fig. 178) ... . ***Pontania* (*Eupontania*) Zinovjev** (p. 129)

12(11) Mâle .... ***Euura* (*Euura*) Newman** ou ***Euura* (*Gemmura*) Smith** (p. 130)

Femelle 13

13(12) Valvule 3 courte : hauteur à peu près égale à la longueur en vue latérale (fig. 176). Cerque généralement aussi long que le bord dorsal de la valvule 3 en vue latérale (fig. 176) .... ***Euura* (*Gemmura*) Smith** (p. 130)

Valvule 3 longue : hauteur inférieure à la longueur en vue latérale (fig. 177). Cerque plus court que le bord dorsal de la valvule 3 en vue latérale (fig. 177) .... ***Euura* (*Euura*) Newman** (p. 130)

14(10) Clypéus pourvu d'une échancrure large et profonde (fig. 181*b*). Surface malaire minimale égale au quart du diamètre de la cavité antennaire (fig. 181*a*). Moitié antérieure du mésépimère partiellement ou entièrement recouverte de soies .... ***Craterocercus* Rohwer** (p. 123)

Clypéus pourvu d'une échancrure peu profonde (fig. 182*b*) ou profonde et étroite (fig. 183*b*). Surface malaire minimale supérieure à la moitié du diamètre de la cavité antennaire (fig. 182*a*, 183*a*). Moitié antérieure du mésépimère sans soies 15

15(14) Dent interne absente sur la griffe du tarse (fig. 187). Clypéus trois fois plus large que long. Cerque de la femelle deux à quatre fois plus long que large. Bord postérieur du dernier sternum du mâle uniformément convexe (fig. 184) .... ***Anoplonyx* Marlatt** (p. 124)

Dent interne bien visible sur la griffe du tarse (fig. 186). Clypéus deux fois plus large que long. Cerque de la femelle de 3 à 20 fois plus long que large. Bord postérieur du dernier sternum du mâle légèrement concave au milieu (fig. 185) 16

16(15) Pulville long : distance entre les pulvilles des articles 1 et 2 du métatarse à peu près égale à leur longueur (fig. 191). Article 1 du flagelle plus long que l'article 3 .... ***Fallocampus*** **Wong** (p. 123)

Pulville court : distance entre les pulvilles des articles 1 et 2 du métatarse environ deux fois leur longueur (fig. 190). Article 1 du flagelle presque aussi long que l'article 3 17

17(16) Femelle : cerque environ 10 fois plus long que large (fig. 188); en vue dorsale, base des valvules 3 très large : environ deux fois la largeur maximale du métatibia (fig. 188) Mâle : nervures 2A et 3A de l'aile antérieure incomplètes et rectilignes (fig. 151); éperon le plus grand, à l'apex du protibia, pourvu d'une dent interne en forme de lame (fig. 192) et surface malaire minimale environ 0,6 fois le diamètre de la cavité antennaire (fig. 195) .... ***Nematinus*** **Rohwer** (p. 125)

Femelle : cerque 3 à 6 fois plus long que large (fig. 189); en vue dorsale, base de la valvule 3 étroite : environ 0,7 fois la largeur maximale du métatibia (fig. 189). Mâle : nervures 2A et 3A complètes (fig. 150), incomplètes et courbées vers le haut, ou incomplètes et rectilignes : éperon le plus grand, à l'apex du protibia, sans dent interne en forme de lame (fig. 193), ou, si la dent est présente, surface malaire minimale inférieure à 0,4 fois le diamètre de la cavité antennaire (fig. 196) .... ***Hemichroa*** **Stephens** 18

18(17) Éperon le plus grand, à l'apex du protibia, pourvu d'une dent interne en forme de lame (fig. 194) .... ***Hemichroa (Hemichroa)*** **Stephens** (p. 122)

Éperon le plus grand, à l'apex du protibia, sans dent interne en forme de lame (fig. 193) .... ***Hemichroa (Varna)*** **Ross** (p. 122)

19(9) Notaulices à peine définies dans la moitié antérieure. Bord postérieur de l'appendice mésoscutellaire touchant la membrane qui le sépare du postnotum du mésothorax (fig. 202). Griffe du tarse sans dent interne .... Pristolini 20

Notaulices nettement définies au moins dans la moitié antérieure (fig. 197). Bord postérieur de l'appendice mésoscutellaire situé nettement au-dessus de la membrane qui le sépare du postnotum du mésothorax (fig. 201). Griffe du tarse pourvue d'une dent interne, ou sans dent interne (quelques espèces de *Pristiphora* et *Neopareophora liturata*) .... Nematini (en partie) 21

20(19) Nervure 2A de l'aile postérieure incomplète (fig. 198), ou complète et cellule anale plus longue que la nervure à l'apex de la cellule anale (fig. 200) .... ***Pristola*** **Ross** (p. 133)

Nervure 2A de l'aile postérieure complète et cellule anale au plus aussi longue que la nervure à l'apex de la cellule anale (fig. 199) .... ***Melastola*** **Wong** (p. 133)

21(19) Nervure 2r de l'aile antérieure présente (fig. 149) 22

Nervure 2r de l'aile antérieure absente 23

22(21) Griffe du tarse sans dent interne (fig. 160). Nervure r de l'aile postérieure absente .... ***Neopareophora*** **MacGillivray** (p. 124)

Griffe du tarse pourvue d'une grande dent interne (fig. 162). Nervure r de l'aile postérieure présente ou absente (fig. 200) .... ***Adelomos*** **Ross** (p. 124)

23(21) Métatibia et articles du tarse (surtout le premier) fortement aplatis et profondément creusés latéralement (fig. 204. 205) 24

Métatibia et articles du tarse peu ou pas aplatis et peu ou pas creusés latéralement (fig. 203) 25

24(23) Apex du métatibia et article 1 du métatarse extrêmement aplatis (fig, 205). Article 1 du métatarse plus long que les longueurs combinées du reste des articles du tarse (fig. 205) .... ***Croesus*** **Leach** (p. 127)

Apex du métatibia et article 1 du métatarse beaucoup moins aplatis que ci-dessus (fig. 204). Article 1 du métatarse aussi long que les longueurs combinées des articles 2, 3 et 4 du tarse (fig. 204) .... ***Nematus*** **Panzer** (peu de taxa : p. 128)

25(23) Surface médiane de la tête près des cavités antennaires peu surélevée en vue latérale et peu ou pas angulaire au-dessous de la fosse médiane (fig. 206*a*). Articles 2 des palpes maxillaires longs : 0,7 à 1,0 fois la longueur de l'article 3 (fig. 206*b*). (Cenchri séparés par une distance égale à leur largeur maximale. Longueur de l'éperon apical le plus petit du métatibia de 0,8 à 1,0 fois la longueur du plus long; longueur de l'éperon apical le plus long du métatibia généralement inférieure à 0,5 fois la longueur de l'article 1 du métatarse.) 26

Surface médiane de la tête près des cavités antennaires nettement surélevée en vue latérale et angulaire au-dessous de la fosse médiane (fig. 207*a*). Article 2 du palpe maxillaire court: 0,5 à 0,7 fois la longueur de l'article 3 (fig. 207 *b*) 28

26(25) Surface malaire minimale au moins deux fois le diamètre de l'ocelle médian 27

Surface malaire minimale de 1 à 1,5 fois le diamètre de l'ocelle médian ....
.... ***Amauronematus* (*Pontopristia*) Malaise** (p. 131)

27(26) Flagelle en forme de soie, les articles apicaux étant nettement plus étroits que ceux de la base. En vue dorsale, valvules 3 adjacentes, avec un apex aig ....
.... ***Amauronematus* (*Amauronematus*) Konow** (p. 131)

Flagelle filiforme, les articles apicaux étant à peine plus étroits que ceux de la base. En vue dorsale, valvules 3 adjacentes, avec un apex dentelé ....
.... ***Amauronematus* (*Decanematus*) Malaise** (p. 131)

28(25) Nervure C de l'aile antérieure enflée près de l'apex et cellule C en forme de corne, non angulaire au niveau de la jonction de Rs+M et R ; cellule C d'une largeur approximativement égale à la moitié de celle de la nervure C au niveau de la jonction de Rs+M et R (fig. 209). Bord antérieur du clypéus généralement rectiligne ou légèrement concave : profondeur de la dépression inférieure à la moitié de la longueur médiane du clypéus (fig. 210). Article 1 du flagelle du mâle pourvu de quelques soies dressées et généralement noires sur la moitié dorsale (dans le cas d'une surface foncée, plus visible le long du bord dorsal sur un fond bien éclairé). En vue dorsale, apex de la valvule 3 échancré ou aigu. (Griffe du tarse avec ou sans dent interne; dent interne, lorsqu'elle est présente, rarement longue et mince. Cenchri généralement petits : largeur maximale 0,5 à 0,7 fois la distance entre les cenchri) .... ***Pristiphora* Latreille** (p. 127)

Nervure C de l'aile antérieure légèrement enflée près de l'apex et cellule C pas en forme de corne, mais angulaire au niveau de la jonction de Rs+M et R; cellule C d'une largeur presque égale à celle de la nervure C au niveau de la jonction de Rs+M et R (fig. 208). Bord antérieur du clypéus concave : profondeur de la dépression de 0,5 à 0,7 fois la longueur médiane du clypéus (fig. 211). Article 1 du flagelle du mâle dépourvu de soies dressées; soies de même taille et de même longueur. En vue dorsale, apex des valvules 3 aigu 29

29(28) Dent interne de la griffe du tarse courte ou longue mais éloignée de la dent apicale (fig. 212, 213) 30

Dent interne de la griffe du tarse longue et située à proximité de la dent apicale (fig. 214, 215) 33

30(29) Bord courbé d'une façon uniforme entre la dent interne et la dent externe de la griffe du tarse (fig. 213) .... ***Eitelius*** **Kontuniemi** (p. 126)

Bord angulaire entre la dent interne et la dent externe de la griffe du tarse (fig. 212) 31

31(30) Sur la tête, cavités pourvues de soies surélevées au-dessus de la surface (plus évident entre les yeux et les ocelles latéraux) (fig. 216). Bord dorsal de la valvule 3 de la femelle aussi long ou légèrement plus court que le cerque (fig.217). Chez le mâle, articles du flagelle pourvus de soies d'une longueur de 30 à 35 µm .... ***Pachynematus*** **Konow** (p. 125)

Sur la tête, cavités pourvues de soies peu ou pas clairement définies, non surélevées au-dessus de la surface. Bord dorsal de la valvule 3 de la femelle presque deux fois la longueur du cerque (fig. 219). Chez le mâle, articles du flagelle pourvus de soies d'une longueur de 50 µm 32

32(31) Femelles seulement (pas de mâles connus). Longueur de la valvifère 2 et de la valvule 3 combinées égale à celle de l'abdomen (fig. 218). Bord dorsal et ventral de la valvule 3 presque rectiligne en vue latérale (fig. 218) .... ***Decanematus dulichus*** **Wong***

Mâle ou femelle. Longueur de la valvifère 2 et de la valvule 3 combinées égale à environ la moitié de celle de l'abdomen (fig. 219). Bord dorsal et ventral de la valvule 3 courbé en vue latérale (fig. 219) .... ***Pikonema*** **Ross** (p. 126)

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* Voir la section intitulée « Diversity » au sous-genre *Decanematus* (p. 131).

33(30) Éperons à l'apex du métatibia nettement inégaux : longueur de l'éperon externe au plus 0,7 fois celle de l'éperon interne (fig. 220). Éperon le plus long, à l'apex du métatibia 0,5 fois aussi long que celui de l'article 1 du métatarse (fig. 220). Corps de longueur supérieure à 5 mm. Flagelle long : article 1 du flagelle 3,5 fois plus long que large chez la femelle et 3 fois plus long que large chez le mâle. Flagelle en forme de soie chez les mâles et les femelles (fig. 155, 156) .... *Nematus* **Rohwer** (la plupart des taxa; p. 128)

Éperons à l'apex du métatibia plus semblables que ci-dessus quant à la longueur : éperon externe 0,75 à 0,9 fois la longueur de l'éperon interne (fig. 221). Éperon le plus long, à l'apex du métatibia, 0,3 (généralement) à 0,5 fois la longueur de celui de l'article 1 du métatarse (fig. 221). Longueur du corps inférieure à 5mm. Flagelle court : article 1 du flagelle de 2 à 3,5 fois plus long que large chez la femelle, ou 2 à 2,5 fois plus long que large chez le mâle. Flagelle filiforme chez la femelle (fig. 157), et filiforme ou en forme de soie chez le mâle 34

34(33) En vue latérale, apex de la valvule 3 aigu (fig. 225, 226). Article 3 du métatarse généralement moins de deux fois plus long que large en vue latérale (fig. 221). Flagelle généralement long : article 1 du flagelle 3,5 fois plus long que large chez la femelle, ou 2,5 fois plus long que large chez le mâle .... ***Phyllocolpa* Benson** (p. 129)

En vue latérale, apex de la valvule 3 arrondi (fig. 223, 224). Article 3 du métatarse généralement deux à trois fois plus long que large en vue latérale (fig. 222). Flagelle court : article 1 du flagelle trois fois plus long que large chez la femelle, ou 2,5 fois plus long que large chez le mâle .... ***Pontania* (*Pontania*) Costa** (p. 128)

Tribe Cladiini

Diagnosis. Adults of Cladiini are distinguished from those of other tribes of the subfamily by the short distance of the vein R between the junctions of the veins M and Rs+M in the fore wing.

Diversity. The tribe consists of three genera and about 35 species, found in Eurasia and North America (Smith 1974c). In North America, including Canada, three genera and eight species are known (Smith 1974c).

Genus *Cladius* Illiger

Diagnosis. Adults of *Cladius* are distinguished from those of other genera of the tribe by the narrow tarsomeres 1–4, by the cercus being as long as the dorsal margin of valvula 3 in females, and by the comb-like structure on flagellomeres 1–3 in males.

Diversity. The genus consists of about nine species found in Eurasia and North America (Smith 1974*c*). In North America, including Canada, one introduced species, *C. difformis* (Panzer), is recorded (Smith 1974*c*).

Host. Larvae feed on roses (Smith 1974*c*).

Comments. Smith (1974*c*) characterized the single North American species of the genus.

Genus *Priophorus* Dahlbom

Diagnosis. Adults of *Priophorus* are distinguished from those of other genera of the tribe by the narrow pulvillus on tarsomeres 1–4, by the cercus being half as long as the dorsal margin of valvula 3 in females, and by the absence of comb-like structures on flagellomeres 1–3 in males.

Diversity. The genus consists of about 20 species found in Eurasia and North America (Smith 1974*c*). In North America, including Canada, four species are known (Smith 1974*c*).

Host. Larvae feed on birch, willow, ***Rubus***, cherry, plum, hawthorn, and alder (Smith 1974*c*).

Comments. Smith (1974*c*) revised the North American species of the genus.

Genus *Trichiocampus* Hartig

Diagnosis. Adults of *Trichiocampus* are distinguished from those of other genera of the tribe by the wide pulvillus on tarsomeres 1–4.

Diversity. The genus consists of six species found in Eurasia and North America (Smith 1974*c*). In North America, including Canada, three species are known (Smith 1974*c*).

Host. Larvae feed on willow and poplar (Smith 1974*c*).

Comments. Smith (1974*c*) revised the North American species of the genus.

Tribe Nematini

Diagnosis. Adults of Nematini are distinguished from those of other tribes by the combination of characters in the key.

Diversity. The tribe consists of over 30 genera and 700 species almost entirely confined to Eurasia and North America except for very few species recorded from Borneo and South America (Benson 1958; Smith 1979*a*). In North America 20 genera and over 350 species are known (Smith 1979*a*). In Canada 18 genera and over 190 species are recorded, but 20 genera and over 320 species are expected.

Genus *Hoplocampa* Hartig

Diagnosis. Adults of *Hoplocampa* are distinguished from those of other North American genera of the tribe by vein 2m-cu in the fore wing, which is joined to cell 2Rs; by the presence of the fore wing vein 2r; and by the combined length of the scape and pedicel, which is 0.7 as long as, or longer than, that of the flagellomere 1.

Diversity. The genus consists of 35 species found in Eurasia and North America (Benson 1958). In North America 21 species are known (Ross 1943*b*). In Canada 14 species are recorded (Smith 1979*a*), but 21 are expected.

Host. Larvae feed in the developing fruit of serviceberry, apple, cherry, hawthorn, and pear (Smith 1979*a*).

Comments. Ross (1943*b*) revised the North American species of the genus.

Genus *Caulocampus* Rohwer

Diagnosis. Adults of *Caulocampus* are distinguished from those of other North American genera of the tribe by vein 2m-cu in the fore wing, which is joined to cell 2Rs; by the absence of the fore wing vein 2r; and by the combined length of the scape and pedicel, which is 0.7 as long as, or longer than, that of the flagellomere 1.

Diversity. The genus consists of two eastern North American species (Smith 1968), both found in Canada.

Host. Larvae of *C. acericaulis* (MacGillivray) mine the petiole of maple leaves (Smith 1979*a*).

Comments. Smith (1968) revised the species of the genus.

Genus *Hemichroa* Stephens

Diagnosis. Adults of *Hemichroa* are distinguished from those of other North American genera of the tribe by the combination of characters in the key.

Diversity. The genus consists of about six species found in Eurasia and North America (Smith 1975*a*). In North America, including Canada, two species are known (Smith 1979*a*).

Comments. Smith (1975*a*) revised the North American species of the genus. He did not recognize the subgenera, but A.G. Zinovjev (personal communication) believes that based on larval food preferences, the genus consists of the Old World *Hemichroa* Stephens and the New World *Verna* Ross.

Subgenus *Hemichroa* Stephens

Diagnosis. Adults of *Hemichroa* are distinguished from subgenus *Varna* by the presence of a small blade-like inner tooth on the largest spur at the apex of the protibia.

Diversity. In North America one introduced species, *M. crocea* (Geoffroy), is recorded.

Host. Larvae feed on alders (Smith 1979*a*).

Comments. See genus *Hemichroa*.

Subgenus *Varna* Ross

Diagnosis. Adults of *Varna* are distinguished from those of the subgenus *Hemichroa* by the absence of a blade-like inner tooth on the largest spur at the apex of the protibia.

Diversity. The subgenus consists of one species, *H. militaris* (Cresson), (Smith 1979*a*).

Host. Larvae feed on serviceberry and cherry (Smith 1979*a*).

Comments. See genus *Hemichroa*.

Genus *Craterocercus* Rohwer

Diagnosis. Adults of *Craterocercus* are distinguished from those of other North American genera of the subfamily by the deeply and widely concave anterior margin of the clypeus, by the presence of vein 2r in the fore wing, and by the very narrow minimum malar space.

Diversity. The genus consists of five species found in North America (Smith 1969*e*). In Canada one species is recorded, but three are expected.

Host. Larvae feed on oaks (Smith 1969*e*).

Comments. Smith (1969*e*) revised the species of the genus.

Genus *Fallocampus* Wong

Diagnosis. Adult females of *Fallocampus*, with the similar shape of the outer surface of the mandibles, are distinguished from those of other North American genera by the very slender cercus and by the long pulvillus on metatarsomeres 1 and 2. Adult males are distinguished from those of other genera of the subfamily by the combination of characters in the key.

Diversity. The genus consists of two species found in North America, including Canada, (Smith 1976*b*; Wong 1977).

Host. Larvae feed on poplar (Smith 1976*b*).

Comments. Smith (1976*b*) revised the species of the genus *Platycampus*, which was subsequently split into two genera by Wong (1977). Wong proposed the genus *Fallocampus* for the North American species.

Genus *Anoplonyx* Marlatt

Diagnosis. Adults of *Anoplonyx* are distinguished from those of other North American genera by the similar shape of the outer surface of the mandibles, by the fore wing vein 2m-cu joined to cell 1Rs, and by the absence of a subapical tooth on the claws.

Diversity. The genus consists of nine species found in Eurasia and North America (Benson 1958). In North America, including Canada, four species are known (Smith 1979*a*).

Host. Larvae feed on larches (Smith 1979*a*).

Comments. The North American species of the genus have not been revised. Wong (1955) characterized the larvae of four species.

Genus *Adelomos* Ross

Diagnosis. Adults of *Adelomos*, with the dissimilar shape of the outer surface of the mandibles, are distinguished from those of other genera of the family by the presence of the vein 2r on the fore wing and by the large inner tooth on the tarsal claws.

Diversity. The genus consists of a single species, *A. cleone* Ross, recorded in the eastern United States (Ross 1935). The species is expected in southernmost Ontario.

Host. Ross (1935) reports that the holotype was collected in late April from flowers of buckeye.

Comments. Ross (1935) characterized the single species of the genus.

Genus *Neopareophora* MacGillivray

Diagnosis. Adults of *Neopareophora*, with the dissimilar shape of the outer surface of the mandibles, are distinguished from those of other genera by the presence of notauli and of the fore wing vein 2r and by the absence of an inner tooth on the tarsal claws.

Diversity. The genus consist of two species restricted to eastern North America (Ross 1935). In Canada one species, *N. litura* (Klug), is known.

Host. Larvae feed on buds and leaves of blueberry (Nielson 1958).

Comments. Ross (1935) revised the species of the genus.

Genus *Nematinus* Rohwer

Diagnosis. Adult females of *Nematinus* in North America are distinguished from those of other genera by the exceptionally wide base of the valvulae 3 when viewed from above. Adult males are distinguished from those of other genera by the combination of characters in the key.

Diversity. The genus consists of about 12 species found in Eurasia and North America (Benson 1958). In North America, including Canada, four species are known (Smith 1986*a*).

Host. Larvae of one North American species are recorded in alder and birch (Smith 1986*a*). In Europe larvae have also been recorded from hazelnut (Benson 1958).

Comments. Smith (1986*a*) revised the North American species of the genus.

Genus *Pachynematus* Konow

Diagnosis. Adults of *Pachynematus*, with a dissimilar outer surface of the mandibles, are distinguished from those of other genera of Nematini by the small inner tooth on claws; by the setae of the head, which are on raised setigerous pits between the eyes and the ocelli; by the emarginated clypeus; and by the narrow costa of the fore wing with a wide C cell below.

Diversity. The genus consists of over 70 species found in Eurasia and North America (Benson 1958). In North America 26 species are known (Smith 1979*a*). In Canada 15 species are recorded, but 26 are expected.

Host. Larvae feed on wheat, sedge, *Festuca*, grass, and willow (Smith 1979*a*). In Europe larvae have been recorded in *Poa*, *Polygonum*, and *Rumex* (Benson 1958).

Comments. The genus is in need of study in North America. However, Ross (1945*a*) and Benson (1963) reviewed portions of the genus. It consists of two subgenera (Zhelochovtsev 1988) distinguished by sexual features and food habit. Larvae of the subgenus *Pachynematus* Konow feed on Graminae. In adults the penis valve has a long posterior spur, and the annuli of valvula 1 is markedly slanted toward the base. Larvae of the subgenus *Polynematus* Zhelochovtsev feed on *Polygonum* and *Rumex*. In adults the penis valve has a short posterior spur, and the annuli of valvula 1 are slightly slanted toward the base or the apex. The subgenera were not described in the key because of the dissections involved.

Genus *Pikonema* Ross

Diagnosis. Females of *Pikonema* are distinguished from those of other North American genera of the subfamily by the very large, long, and flat valvulae 3. Males are best diagnosed by the combination of characters in the key.

Diversity. The genus consists of 10 species (Zhelochovtsev 1988). In Canada and the United States three species are found.

Host. Larvae feed on a wide range of spruces (Ross 1938).

Comments. Ross (1938) revised the species of the genus.

Genus *Eitelius* Kontuniemi

Diagnosis. Adults of *Eitelius* are distinguished from those of other North American genera of the subfamily by the C-shaped margin between the tarsal inner and outer teeth.

Diversity. The genus consists of one Eurasian and one eastern North American species (Wong 1967). *Eitelius gregarius* (Marlatt) is recorded in Canada.

Host. Larvae feed on willows (Wong 1967).

Comments. Wong (1967) characterized the single North American species of the genus.

Genus *Pristiphora* Latreille

Diagnosis. Adults of *Pristiphora*, with the dissimilar outer surface of the mandibles, are distinguished from those of other North American genera of the subfamily by the markedly elevated surface between antennal sockets, by the presence of a widened and concave surface at the apex of valvula 3 in most species, by the usually truncate clypeus, and by the narrow horn-like cell C of the fore wing.

Diversity. The genus consists of over 140 species known in Eurasia and North America and a few species known in Borneo and South America (Benson 1958; Smith 1979*a*). In North America over 50 species are recorded (Smith 1979*a*). In Canada probably over 40 species are known.

Host. Larvae feed on apple, willow, columbine, *Vaccinium*, spiraea, birch, oak, larch, mountain ash, spruce, *Rubus*, *Geum*, *Potentilla*, *Ribes*, and alder (Smith 1979*a*).

Comments. The North American species have not been revised recently, but the genus is currently being studied by H.R. Wong in Edmonton, Alta. The genus has been divided into seven subgenera (Zhelochovtsev 1988), most of which are distinguished by characters of the male and female genitalia. Five of these subgenera are found in Canada: *Lygaeonematus* Konow, *Lygaeotus* Hellen, *Stauronematus* Benson, *Micronematus* Konow, and *Pristiphora* Latreille. They were not included in the key because of the dissections required.

Genus *Croesus* Leach

Diagnosis. Adults of *Croesus* are distinguished from those of other genera of sawflies by the markedly enlarged metatibia and metatarsomere 1, which look like the hind leg of a bee.

Diversity. The genus consists of about nine species found in Eurasia and mainly in the eastern part of North America (Benson 1958). In North America four species are known (Smith 1972). In Canada two species are recorded, but four are expected.

Host. Larvae feed on alder, birch, hazelnut, and buckeye (Smith 1972).

Comments. Smith (1972) revised the North American species of the genus.

Genus *Nematus* Panzer

Diagnosis. Adults of *Nematus* are distinguished from those of other North American genera by the combination of characters in the key.

Diversity. The genus consists of over 120 species found in Eurasia and North America (Benson 1958). In North America over 50 species are known (Smith 1979*a*). In Canada over 40 species are recorded.

Comments. The species of the genus are being revised by D.R. Smith (Washington, D.C.).

Genus *Pontania* Costa

Diagnosis. Adults of the genus *Pontania* are distinguished from those of other North American genera of the subfamily by the combination of characters in the key.

Diversity. The genus consists of over 50 species found in Eurasia and North America (Benson 1958, 1960). In North America about 40 species are known (Smith 1979*a*). In Canada about 20 species are recorded, but about 25 are expected.

Host. Larvae feed in pea- or bean-like galls on leaves of willows (Smith 1979*a*).

Comments. The genus is in need of study.

Subgenus *Pontania* Konow

Diagnosis. Adults of the subgenus *Pontania* are recognized by the clearly asymmetrical mandibles: the left one is markedly constricted along the outer surface.

Diversity. The subgenus is diverse in North America, but the number of species is still unknown.

Host. Larvae feed in pea- or bean-like galls on leaves of willows (Smith 1979*a*).

Subgenus *Eupontania* Zinovjev

Diagnosis. Adults of *Eupontania* are recognized by symmetrical mandibles: the right and left mandible are not appreciably constricted.

Diversity. The subgenus is diverse in North America, but the number of species is still unknown.

Host. Larvae feed in pea- or bean-like galls on leaves of willows (Smith 1979*a*).

Comments. Zinovjev (1985) recently described this subgenus.

Genus *Phyllocolpa* Benson

Diagnosis. Adults of *Phyllocolpa* are distinguished from those of other North American genera of the subfamily by the combination of characters in the key.

Diversity. The genus consists of over 40 species found in Eurasia and North America (Benson 1958, 1960). In North America about 25 species are known (Smith 1979*a*). In Canada about nine species are recorded, but over 13 are expected.

Host. Larvae feed inside rolled leaves or leaf edges of willows and poplars (Smith 1979*a*).

Comments. The genus needs study; Ross (1929) studied some species.

Genus *Euura* Newman

Diagnosis. Adults of the genus *Euura* are distinguished from those of other genera of the subfamily by the similar and very short mandibles and by the absence of vein 2r-m in the fore wing.

Diversity. This is a large genus found in Eurasia and North America (Benson 1958). In North America at least 32 species are known (Smith 1979*a*). In Canada nine species are recorded, but over 13 are expected.

Comments. The genus needs study. E.L. Smith (1968) studied the species in California and demonstrated the difficulties facing students of the genus.

Subgenus *Euura* Newman

Diagnosis. Females of the subgenus *Euura* are distinguished from those of the subgenus *Gemmura* by valvula 3, which is longer than high. Males cannot be characterized.

Diversity. In Eurasia and North America most species of the genus belong to this subgenus (Benson 1958; Smith 1979*a*).

Host. Larvae feed in stem, twig, or petiole galls of willow (Smith 1968).

Comments. See genus *Euura*.

Subgenus *Gemmura* Smith

Diagnosis. Females of *Gemmura* are distinguished from those of the subgenus *Euura* by valvula 3, which is shorter than high. Males cannot be characterized.

Diversity. The subgenus is known by a few species found in Eurasia and North America (Benson 1958; Smith 1979*a*).

Host. Larvae feed in bud galls of willow (Smith 1968).

Comments. See genus *Euura*.

Genus *Amauronematus* Konow

Diagnosis. Adults of the genus *Amauronematus* are generally distinguished from those of other North American genera of the subfamily by the slightly elevated surface between the antennal sockets and by the rather short maxillary palpomere 2.

Diversity. The genus consists of over 120 species found in Eurasia and North America (Benson 1958). In North America over 50 species are known (Smith 1979*a*). In Canada about 30 species are recorded, but over 45 are expected.

Comments. The genus needs study.

Subgenus *Amauronematus* Konow

Diagnosis. Adults of the subgenus *Amauronematus* are distinguished from those of *Decanematus* by the long minimal malar space and from those of *Pontopristia* by the seta-like antennae, tapering toward the apex, and by the sharply adjacent valvulae 3.

Diversity. Most species of the genus belong to this subgenus.

Host. Larvae feed on willow (the main host) and *Rhododendron* (Smith 1979*a*). In Europe A.G. Zinovjev (personal communication) reports larvae from *Betula*, *Vaccinium*, and *Potentilla fructicosa*.

Subgenus *Pontopristia* Malaise

Diagnosis. Adults of *Pontopristia* are distinguished from those of *Decanematus* by the long minimal malar space; from those of *Amauronematus* by the thread-like antenna, slightly or not tapering toward the apex; and from both these subgenera by the indented apex of adjacent valvulae 3.

Diversity. Over 10 species are reported in Eurasia (Zhelochovtsev 1988), two or three of which are found in Canada and the United States.

Host. Larvae are found in catkins of willow.

Subgenus *Decanematus* Malaise

Diagnosis. Adults of *Decanematus* are distinguished from those of the other two subgenera of the genus by the short minimal malar space.

Diversity. The subgenus is small, with several species found in Eurasia (Zhelochovtsev 1988) and two in North America, *D. viduatus* (Zetterstedt) and *D. lineatus* (Harrington). Wong (1968*a*) incorrectly assigned *D. dulichus* to this lineage. When this species is keyed to northern European genera (Zhelochovtsev 1988), it runs to *Pikonema* Ross and *Larinematus* Zhelochovtsev but does not match either. According to A.G. Zinovjev (personal communication), *Decanematus dulichus* probably belongs near *Polynematus* Zhelochovtsev.

Comments. The subgenus is most likely more diverse in North America and needs study preceded by careful fieldwork and rearing programs.

Tribe Pseudodineurini

Diagnosis. Adults of Pseudodineurini are distinguished from those of other tribes by the incomplete development of the hind wing veins 2A and 3A.

Diversity. The tribe consists of three genera found in Eurasia and North America (Benson 1958). Two genera are found in North America, including Canada (Smith 1979*a*). All genera were characterized by Smith (1976*d*).

Genus *Pseudodineura* Konow

Diagnosis. Adults of the North American species of the genus *Pseudodineura* are distinguished from those of the genus *Kerita* by the dull and punctate postocular region of the head in lateral view.

Diversity. The genus consists of about 13 species found in Eurasia and North America (Benson 1958). In North America four species are known. In Canada two species are known, but four are expected.

Host. Larvae feed on *Hepathica* and *Ranunculus* (Smith 1976*d*).

Comments. Smith (1976*d*) revised the species.

Genus *Kerita* Ross

Diagnosis. Adults of *Kerita* are distinguished from those of *Pseudodineura* by the smooth and bright postocular region of the head in lateral view.

Diversity. The genus consists of three species (Smith 1976*d*) restricted to North America. In Canada one species is recorded but three are expected.

Host. Larvae attack *Mertensia*.

Comments. Smith (1976*d*) revised the species.

Tribe Pristolini

Diagnosis. Adults of Pristolini are distinguished from those of other tribes of the subfamily by the notauli, which are hardly (only near anterior margin) or not outlined.

Diversity. The tribe consists of two genera restricted to North America (Wong 1968*b*). In Canada two genera are recorded.

Genus *Pristola* Ross

Diagnosis. Adults of *Pristola* are distinguished from those of *Melastola* by the vein at the apex of the anal cell of the hind wing, which is clearly shorter than the length of the cell, or by the absence of an anal cell.

Diversity. The genus consists of two species found in North America (Wong 1968*b*). In Canada one species, *P. macnabi* Ross, is known.

Host. Larvae feed on *Vaccinium* (Wong 1968*b*).

Comments. Wong (1968*b*) revised the species of the genus.

Genus *Melastola* Wong

Diagnosis. Adults of *Melastola* are distinguished from those of *Pristola* by the vein at the apex of the anal cell of the hind wing, which is as long as the length of the cell.

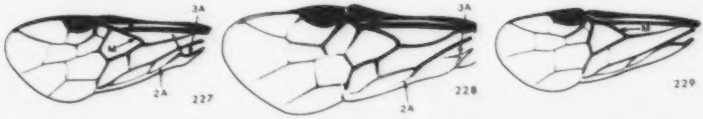
Diversity. The genus consists of two North American species (Wong 1968*b*). In Canada one species, *M. ferruginosa* Wong, is known, but two are expected.

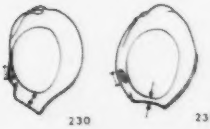
Comments. Wong (1968*b*) revised the species of the genus.

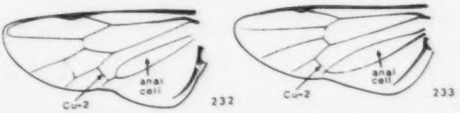
Subfamily Heterarthrinae

Diagnosis. Adults of Heterarthrinae, with fore wing veins M and 1m-cu clearly convergent, are distinguished from those of other subfamilies of Tenthredinidae by the presence of fore wing vein 2r and by the short vein R between junctions of veins M and Rs+M.

Diversity. The subfamily consists of 22 genera and 93 species (Smith 1971*a*, 1976*c*). The range of most species is in Eurasia and North America, but a few occur in North Africa and South America (Smith 1971*a*, 1976*c*). In North America 13 genera and 38 species are known (Smith 1971*a*). In Canada 11 genera and 23 species are recorded, but 32 species are expected.







Figs. 227–229. Fore wing. 227, *Endelomyia aethiops* (Fabricius); 228, *Fenusa pusilla* (Lepeletier); 229, *Heterarthrus nemoratus* (Fallén).
Figs. 230, 231. Lateral view of head. 230, *H. nemoratus*; 231, *Scolioneura betuleti* (Klug).
Figs. 232, 233. Hind wing. 232, *E. aethiops*; 233, *Caliroa cerasi* (Linnaeus).

Key to tribes and genera of Heterarthrinae

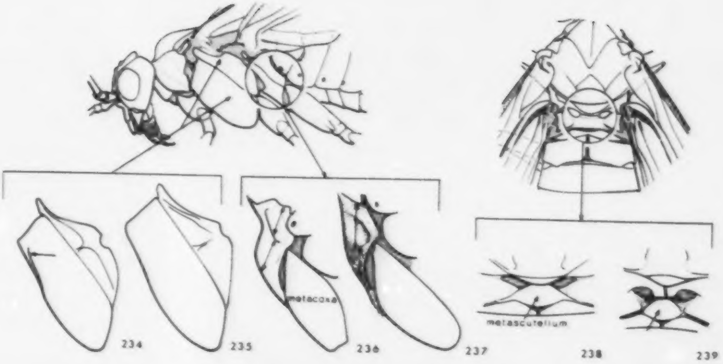
1 Vein 2A and 3A of fore wing completely outlined (Fig. 227) 2

Vein 2A and 3A of fore wing incompletely outlined (Fig. 228) .... Fenusini 4

2(1) Head with pale patterns. Minimal malar space about as long as diameter of antennal socket (Fig. 230). Antenna with 8 flagellomeres. Vein M of fore wing straight (Fig. 229) .... Heterarthrini: ***Heterarthrus* Stephens** (p. 140)

Head black. Minimal malar space 0.1–0.2 of diameter of antennal socket (Fig. 231). Antenna with 7 flagellomeres. Vein M of fore wing curved (Fig. 227) .... Caliroini 3

3(2) Mesoscutellar appendage with at most 2 setae. Basal anal cell of fore wing with short projecting spur along vein 2A and 3A (Fig. 227). Vein Cu-2 far from apex of anal cell of hind wing (Fig. 232). Metepimeron as high as metepisternum in lateral view (Fig. 236) .... ***Endelomyia* Ashmead** (p. 139)


metacoxa
metascutellum
234
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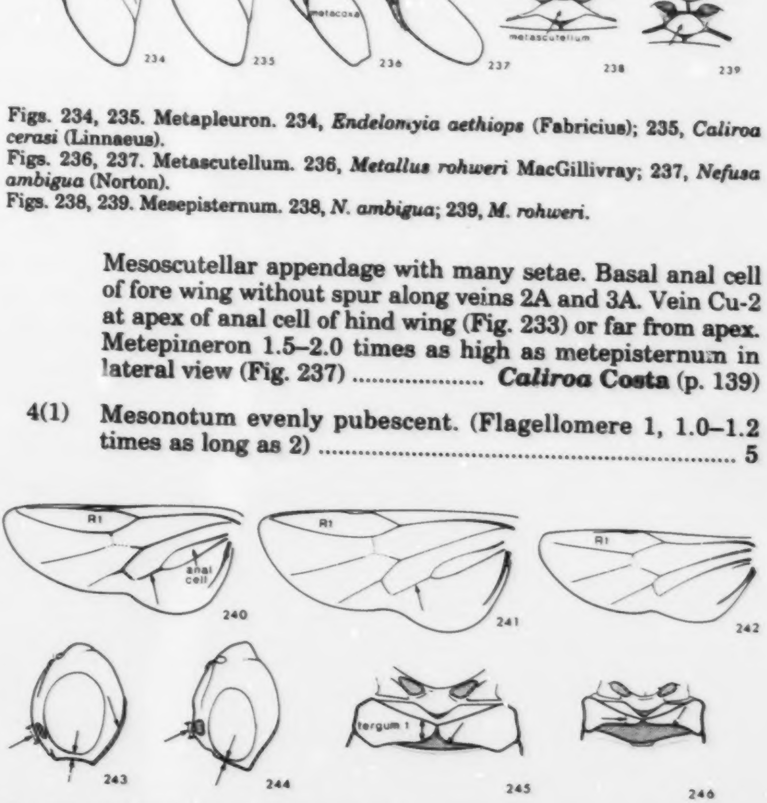
Figs. 234, 235. Metapleuron. 234, *Endelomyia aethiops* (Fabricius); 235, *Caliroa cerasi* (Linnaeus).

Figs. 236, 237. Metascutellum. 236, *Metallus rohweri* MacGillivray; 237, *Nefusa ambigua* (Norton).

Figs. 238, 239. Mesepisternum. 238, *N. ambigua*; 239, *M. rohweri*.

Mesoscutellar appendage with many setae. Basal anal cell of fore wing without spur along veins 2A and 3A. Vein Cu-2 at apex of anal cell of hind wing (Fig. 233) or far from apex. Metepimeron 1.5–2.0 times as high as metepisternum in lateral view (Fig. 237) .... ***Caliroa* Costa** (p. 139)

4(1) Mesonotum evenly pubescent. (Flagellomere 1, 1.0–1.2 times as long as 2) 5


R1
anal cell
R1
R1
240
241
242
tergum 1
243
244
245
246

Figs. 240–242. Hind wing. 240, *Messa hortulana* (Klug); 241, *M. nana* (Klug); 242, *Fenusa pusilla* (Lepeletier).

Figs. 243, 244. Lateral view of head. 243, *Scolioneura betuleti* (Klug); 244, *Profenusa canadensis* (Marlatt).

Figs. 245, 246. Abdominal tergum 1 (membranous area stippled). 245, *P. canadensis*; 246, *F. pusilla*.

Mesonotum without pubescence at least on middle half of median lobe, and on most of lateral lobe 6

5(4) Epicnemial area not outlined (Fig. 235). Metascutellum relatively stout and convex (Fig. 238). Pedicel wider than long .... ***Metallus* Forbes** (p. 140)

Epicnemial area outlined by furrow (Fig. 234). Metascutellum relatively small and slightly convex (Fig. 239). Pedicel slightly longer than wide .... ***Nefusa* Ross** (p. 142)

6(4) Postocular region of head in lateral view with occipital ridge (Fig. 243). Flagellomere 6, 3 times longer than wide. (Pedicel wider than long.) ...... ***Scolioneura* Konow** (p. 142)

Postocular region of head in lateral view without occipital ridge (Fig. 244). Flagellomere 6, 1–2 times longer than wide 7

7(6) Hind wing with R_1 cell closed or almost so (Figs. 240, 241). Anal cell of hind wing closed and with vein at apex (Fig. 240) 8

Hind wing with R_1 cell widely open (Fig. 242). Anal cell of hind wing not closed (Fig. 242) or closed and with vein at apex (two species of *Profenusa*) 9

8(7) Tegula white. Minimum malar space 0.3 of diameter of antennal socket (Fig. 243). Antenna with 7 or 8 flagellomeres. Tarsal claw with large basal lobe .... ***Messa* Leach** (p. 141)

Tegula black. Minimum malar space 0.1–0.3 of diameter of antennal socket (Fig. 244). Antenna with 7 flagellomeres. Tarsal claw with small and blunt basal lobe .... ***Setabara* Ross** (p. 141)

9(7) Antenna with 9 or 10 flagellomeres. (Wing clear.) .... ***Fenella* Westwood** (p. 143)

Antenna with 7 flagellomeres 10

10(9) Membranous area between terga 1 and 2 small: tergum 1 long near midline (Fig. 245). Median lobe of mesoscutum with 20–40 setae laterally .... ***Profenusa* MacGillivray** (p. 141)

Membranous area between terga 1 and 2 large: tergum 1 short near midline (Fig. 246). Median lobe of mesoscutum with 0–10 setae laterally .... ***Fenusa* Leach** (p. 143)

Clé des tribus et des genres d' Heterarthrinae

1 Nervures 2A et 3A de l'aile antérieure complètement définies (fig. 227) 2

Nervures 2A et 3A de l'aile antérieure pas complètement définies (fig. 228) .... Fenusini 4

2(1) Tête à motifs pâles. Surface malaire minimale d'une longueur à peu près égale au diamètre de la cavité antennaire (fig. 230). Antenne à flagelle de 8 articles. Nervure M de l'aile antérieure rectiligne (fig. 229) .... Heterarthrini : ***Heterarthrus*** **Stephens** (p. 140)

Tête noire. Surface malaire minimale 0,1 à 0,2 fois le diamètre de la cavité antennaire (fig. 231). Antenne à flagelle de 7 articles. Nervure M de l'aile antérieure courbée (fig. 227) .... Caliroini 3

3(2) Appendice mésoscutellaire portant au plus 2 soies. Cellule anale basale de l'aile antérieure pourvue d'un éperon court se prolongeant le long des nervures 2A et 3A (fig. 227). Nervure Cu-2 loin de l'apex de la cellule anale de l'aile postérieure (fig. 232). Métépimère aussi élevée que le métépisternum en vue latérale (fig. 236) .... ***Endelomyia*** **Ashmead** (p. 139)

Appendice mésoscutellaire pourvu de nombreuses soies. Cellule anale basale de l'aile antérieure sans éperon le long des nervures 2A et 3A. Nervure Cu-2 située à l'apex de la cellule anale de l'aile postérieure (fig. 233) ou loin de l'apex. Métépimère de 1,5 à 2,0 fois plus élevée que le métépisternum en vue latérale (fig. 237) .... ***Caliroa*** **Costa** (p. 139)

4(1) Mésonotum uniformément pubescent. (Article 1 du flagelle 1,0 à 1,2 fois la longuer de l'article 2) 5

Mésonotum non pubescent au moins sur la moitié médiane du lobe médian, et sur la plus grande partie du lobe latéral 6

5(4) Epicnémium non défini (fig. 235). Métascutellum relativement fort et convexe (fig. 238). Pédicelle plus large que long .... ***Metallus*** **Forbes** (p. 140)

Epicnémium défini par un sillon (fig. 234). Métascutellum relativement petit et légèrement convexe (fig. 239). Pédicelle légèrement plus long que large .... ***Nefusa*** **Ross** (p. 142)

6(4) En vue latérale, région postoculaire de la tête pourvue d'une carène occipitale (fig. 243). Article 6 du flagelle, 3 fois plus long que large. (Pédicelle plus large que long.) .... ***Scolioneura*** **Konow** (p. 142)

En vue latérale, région postoculaire de la tête sans carène occipitale (fig. 244). Article 6 du flagelle, de 1 à 2 fois plus long que large 7

7(6) Cellule R_1 de l'aile postérieure fermée ou presque fermée (fig. 240, 241). Cellule anale de l'aile postérieure fermée et pourvue d'une nervure à l'apex (fig. 240) 8

Cellule R_1 de l'aile postérieure largement ouverte (fig. 242). Cellule anale de l'aile postérieure non fermée (fig. 242), ou fermée et pourvue d'une nervure à l'apex (deux espèces de *Profenusa*) 9

8(7) Tegula blanche. Surface malaire minimale 0,3 fois le diamètre de la cavité antennaire (fig. 243). Antenne à flagelle de 7 ou 8 articles. Griffe du tarse possédant un grand lobe basal .... ***Messa*** **Leach** (p. 141)

Tegula noire. Surface malaire minimale de 0,1 à 0,3 fois le diamètre de la cavité antennaire (fig. 244). Antenne à flagelle de 7 articles. Griffe du tarse possédant un lobe basal petit et émoussé .... ***Setabara*** **Ross** (p. 141)

9(7) Antenne à flagelle de 9 ou 10 articles. (Aile de teinte claire) .... ***Fenella*** **Westwood** (p. 143)

Antenne à flagelle de 7 articles 10

10(9) Surface membraneuse entre les terga 1 et 2, petite : tergum 1 long près de la ligne médiane (fig. 245). Lobe médian du mésoscutum avec 20–40 soies latéralement .... ***Profenusa*** **MacGillivray** (p. 141)

Surface membraneuse entre les terga 1 et 2, grande : tergum 1 court le long de la ligne médiane (fig. 246). Lobe médian du mésoscutum avec 0–10 soies latéralement .... ***Fenusa*** **Leach** (p. 143)

Tribe Caliroini

Diagnosis. Adults of Caliroini are distinguished from those of other tribes of the subfamily by the completely outlined veins 2A and 3A in the fore wing and by the narrow minimum malar space.

Diversity. The tribe consists of two genera found in Eurasia and North America (Smith 1971*a*).

Genus *Endelomyia* Ashmead

Diagnosis. Adults of *Endelomyia* are distinguished from those of *Caliroa* by the hairy mesoscutellar appendage and by the length of flagellomere 4, which is two-thirds that of flagellomere 3.

Diversity. The genus consists of one species, *E. aethiops* (Fabricius), found in Eurasia and throughout North America (Smith 1971*a*).

Host. Larvae are external feeders on roses (Smith 1971*a*).

Comments. Smith (1971*a*) characterized the single species of the genus.

Genus *Caliroa* O. Costa

Diagnosis. Adults of *Caliroa* are distinguished from those of *Endelomyia* by the hairless, or almost so, mesoscutellar appendage and by the length of flagellomere 4, which is three-quarters that of flagellomere 3.

Diversity. The genus consists of about 30 species found in Eurasia and North America (Smith 1971*a*). In North America 14 species are known (Smith 1971*a*). In Canada six species are known, but 11 are expected.

Host. Larvae are external feeders on oak, willow, cherry, apple and other Rosaceae, buckeye, and tupelo (Smith 1971*a*).

Comments. Smith (1971*a*) revised the North American species of the genus.

Tribe Heterarthrini

Diagnosis. Adults of Heterarthrini are distinguished from those of other tribes of the subfamily by the complete veins 2A and 3A in the fore wing and by the wide minimal malar space.

Diversity. The tribe consists of one genus, *Heterarthrus* (Smith 1971*a*).

Genus *Heterarthrus* Stephens

Diversity. The genus *Heterarthrus* consists of about 10 species, nine of which are restricted to Eurasia (Smith 1971*a*). In North America, including Canada, one introduced species, *H. nemoratus* (Fallén), is known (Smith 1971*a*).

Host. Larvae are leaf miners of birch (Smith 1971*a*).

Comments. Smith (1971*a*) characterized the single North American species of the genus.

Tribe Fenusini

Diagnosis. Adults of Fenusini are distinguished from those of other tribes by the incompletely outlined veins 2A and 3A in the fore wing.

Diversity. The tribe consists of 19 genera and 53 species found in Eurasia, North and South America, and North Africa (Smith 1976*c*). In North America 11 genera and 20 species are known (Smith 1971*a*; H. Goulet unpublished data). In Canada eight genera and 15 species are recorded, but 19 species are expected.

Host. All known larvae are leaf miners (Smith 1976*c*, 1971*a*).

Genus *Metallus* Forbes

Diagnosis. Adults of *Metallus* are distinguished from those of other North American genera of the tribe by the hairy mesonotum and by the wide pedicel.

Diversity. The genus consists of about eight species found in Eurasia and North America (Smith 1971*a*). In North America, including Canada, four species are known (Smith 1971*a*).

Host. Larvae feed on *Rubus* (Smith 1971*a*).

Comments. Smith (1971*a*) revised the North American species of the genus, recently adding one more species (1988*b*).

Genus *Messa* Leach

Diagnosis. Adults of *Messa* are distinguished from those of other North American genera of the tribe by the hairless mesonotum at least on the medial half of the median lobe, by the short flagellomeres, by the closed or almost closed R_1 cell in the hind wing, and by the white tegula.

Diversity. The genus consists of eight species found in Eurasia and North America (Smith 1971*a*). In North America five species are known (Smith 1971*a*). In Canada three species are recorded, but five are expected.

Host. Larvae feed on poplar, willow, and birch (Smith 1971*a*).

Comments. Smith (1971a) revised the North American species of the genus.

Genus *Setabara* Ross

Diagnosis. Adults of *Setabara* are distinguished from those of other North American genera of the tribe by the hairless mesonotum at least on the middle half of the median lobe, by the short flagellomeres, by the closed or almost closed R_1 cell of the hind wing, and by the black tegula.

Diversity. The genus consists of one species, *S. histrionica* (MacGillivray), recorded in the western United States (Smith 1971*a*). The species is expected in southern British Columbia.

Comments. Smith (1971*a*) characterized the single species of the genus.

Genus *Profenusa* MacGillivray

Diagnosis. Adults of *Profenusa* are distinguished from those of other North American genera of the tribe by the hairless mesonotum at least on the middle half of the median lobe, by the short flagellomeres, by the widely open R_1 cell of the hind wing, by the 7 flagellomeres, and by the small membranous area between terga 1 and 2.

Diversity. The genus consists of about eight species found in Eurasia and North America (Smith 1971*a*). In North America five species are known (Smith 1971*a*). In Canada three species are recorded, but four are expected.

Host. Larvae feed on oak, cherry, hawthorn, and birch (Smith 1971*a*).

Comments. Smith (1971*a*) revised the North American species of the genus.

Genus *Nefusa* Ross

Diagnosis. Adults of *Nefusa* are distinguished from those of other North American genera of the tribe by the hairy mesonotum and the elongate pedicel.

Diversity. The genus consists of two species, one from Burma and *N. ambigua* (Norton) from eastern North America (Smith 1976*c*).

Host. Larvae feed on violets (Smith 1971*a*).

Comments. Smith (1971*a*) characterized the single North American species of the genus.

Genus *Scolioneura* Konow

Diagnosis. Adults of *Scolioneura* are distinguished from those of other genera of the tribe by the very elongate flagellomeres and by the occipital ridge on the posterior margin of the head in lateral view.

Diversity. The genus consists of two species found in Europe and North America (Smith 1976*c*). One species, *S. betuleti* (Klug), was recently introduced in southeastern Canada.

Host. Larvae feed on birch (Smith 1976*c*).

Comments. Benson (1952) characterized the single North American species of the genus. Kathryn and Evans (1989) describe the larval instars and the biology.

Genus *Fenusa* Leach

Diagnosis. Adults of *Fenusa* are distinguished from those of other North American genera of the tribe by the hairless mesonotum at least on the middle half of the median lobe, by the short flagellomeres, by the widely open R_1 cell of the hind wing, by the 7 flagellomeres, and by the wide membranous area between terga 1 and 2.

Diversity. The genus consists of three species found in Eurasia and North America (Smith 1971*a*). In North America, including Canada, three species are known (Smith 1971*a*).

Host. Larvae are leafminers on birch, alder, and elm (Smith 1971*a*).

Comments. Smith (1971*a*) revised the species of the genus.

Genus *Fenella* Westwood

Diagnosis. Adults of *Fenella* are distinguished from those of other North American genera of the tribe by the hairless mesonotum at least on the middle half of the median lobe, by the short flagellomeres, by the widely open R_1 cell of the hind wing, and by the 9 or 10 flagellomeres.

Diversity. The genus consists of about six species found in Eurasia and North America (Smith 1971*a*). In eastern North America one species, *F. nigrita* Westwood, is known (Smith 1971*a*).

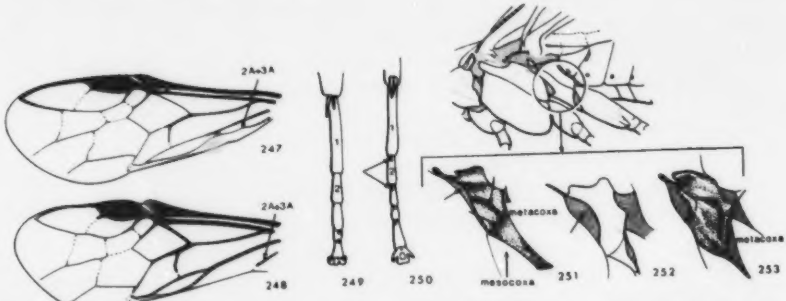
Host. Larvae feed on *Potentilla* (Smith 1971*a*).

Comments. Smith (1971*a*) characterized the single species of the genus.

Subfamily Blennocampinae

Diagnosis. Adults of Blennocampinae are generally distinguished from those of other subfamilies of Tenthredinidae by the angle formed by the veins 1m-cu and Cu_1 of the fore wing, which is between 120–150°; and by the veins 2A and 3A of the fore wing, which are not completely outlined or, if outlined, are slightly constricted in the basal cell.

Diversity. The range of the subfamily extends throughout humid temperate and tropical regions of the world (Smith 1969c).



Figs. 247, 248. Fore wing. 247, *Blennogeneris spissipes* (Cresson); 248, *Erythraspides carbonarius* (Cresson).
Figs. 249, 250. Ventral view of metatarsus. 249, *E. carbonarius*; 250, *Stethomostus fuliginosus* (Schrank).
Figs. 251–253. Metapleuron, lateral view (membranous surface stippled). 251, *Halidamia affinis* (Fallén); 252, *E. carbonarius*; 253, *Phymatocera smilacinae* Smith.

Key to tribes, genera, and subgenera of Blennocampinae

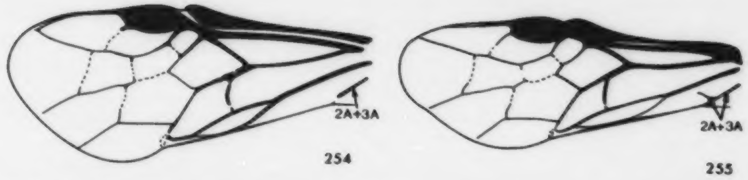
1 Vein 2A and 3A of fore wing completely outlined and narrowly joined to 1A (Fig. 247) .... Lycaotini 2

Vein 2A and 3A of fore wing incompletely outlined and not joined to 1A (Fig. 248) 3

2(1) Legs black, fore wing darkened .... *Lycaota* **Konow** (p. 155)

Legs reddish brown, fore wing clear .... *Blennogeneris* **MacGillivray** (p. 154)

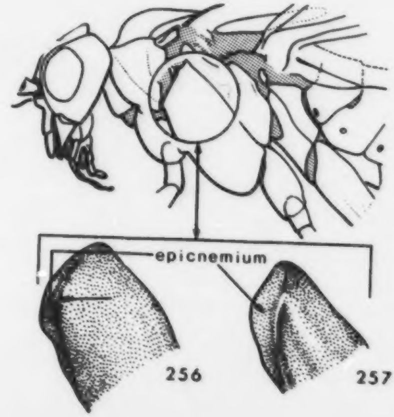
3(1) Pulvillus not developed on tarsomeres 1 and 2 (Fig. 249). Ventral surface of all or any of flagellomeres 4–7 pale (pale surface thinly sclerotized and generally collapsed in dry specimens) and each much shorter than 3. Metepimeron with two furrows or dark outlines forming an angle near junction with metacoxa (Fig. 251). (Tarsal claw with long subapical tooth and basal lobe.) .... Waldheimiini 4

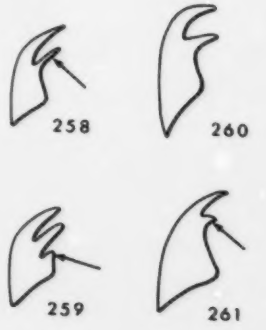


Figs. 254, 255. Fore wing. 254, *Erythraspides carbonarius* (Cresson); 255, *Halidamia affinis* (Fallén).

Pulvillus clearly developed on tarsomeres 1 and 2 (Fig. 250). Ventral surface of flagellomeres 4–7 thickly sclerotized (not collapsed in dry specimens) and about as long as or slightly shorter than 3. Metepimeron without furrow near metacoxa or with slightly curved furrow near margin of metacoxa (Fig. 253) 5

4(3) Fore wing with vein 2A and 3A curved up at apex (Fig. 255). Membranous area between mesopleuron and metapleuron small or absent, because posterior margin of mesepimeron convex and anterior margin of metepimeron slightly concave (Fig. 251) ...... ***Halidamia* Benson** (p. 163)





Figs. 256, 257. Dorsal half of mesepisternum. 256, *Tethida barda* (Say); 257, *Phymatocera smilacinae* Smith.
Figs. 258–261. Tarsal claw. 258, *Ardis brunniventris* (Hartig); 259, *Periclista diluta* (Cresson); 260, *Phymatocera smilacinae*; 261, *Phymatocera rusculla* (MacGillivray).

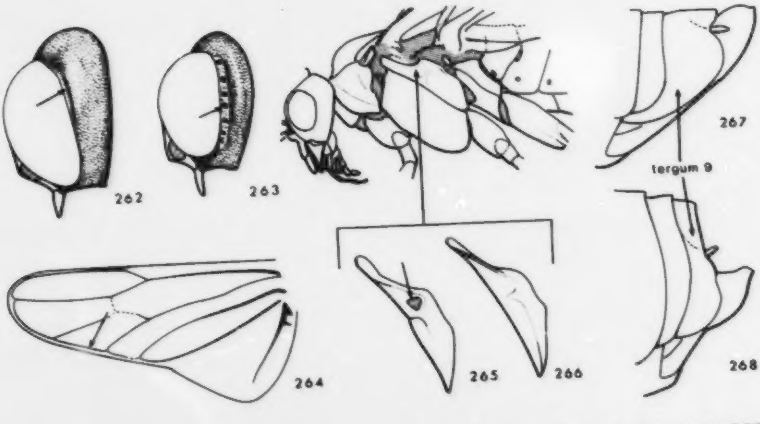
Fore wing with vein 2A and 3A straight (Fig. 254). Membranous area between mesopleuron and metapleuron large, because posterior margin of mesepimeron straight or slightly concave and anterior margin of metepimeron deeply concave (Fig. 252) .... ***Erythraspides* Ashmead** (p. 163)

5(3) Epicnemial region clearly outlined by narrow furrow and occurring on same plane as mesepisternum (Fig. 256) .... Tomostethini 6

Epicnemial region not outlined, or outlined by wide furrow, and occurring on different plane from mesepisternum (Fig. 257) 7

6(5) Mesonotum densely pubescent. Mesoscutellum and mesepisternum with fine pits. Basal 0.2 of clypeus impressed and without setae .... ***Tomostethus* Konow** (p. 155)

Mesonotum with scattered setae mainly in central portion of each sclerite. Mesoscutellum and mesepisternum smooth. Basal 0.2 of clypeus not impressed and mostly covered with setae .... ***Tethida* Ross** (p. 156)



Figs. 262, 263. Lateral view of head. 262, *Ardis brunniventris* (Hartig); 263, *Monophadnoides geniculatus* (Hartig).
Fig. 264. Hind wing of *Periclista diluta* (Cresson).
Figs. 265, 266. Mesepimeron (membranous area stippled). 265, *P. diluta*; 266, *M. geniculatus*.
Figs. 267, 268. Abdominal tergum 9 of female. 267, *P. pallipes* (Provancher); 268, *P. diluta*.

7(5) Tarsal claw with long preapical tooth (Fig. 258) and epicnemial region not outlined. Tarsal claw with (Fig. 259) or without basal lobe .... Blennocampini 8

Tarsal claw without or with short preapical tooth (Fig. 261), or with long inner tooth and with clearly outlined epicnemial region. Tarsal claw without basal lobe (Fig. 260) 12

8(7) Groove near posterior margin of eye wide and deep, with large pits (Fig. 263) .... ***Ardis*** **Konow** (p. 159)

Groove near posterior margin of eye narrow and shallow, without pits (Fig. 262) 9

9(8) Anepimeron of mesopleuron with small to large membranous area (except in *Periclista marginicollis*) (Fig. 265). Fore wing with veins 2A and 3A curved up at apex (Fig. 255) .... ***Periclista*** **Konow** 11

Anepimeron of mesopleuron without membranous area (Fig. 266). Fore wing with vein 2A and 3A straight at apex (Fig. 254) 10

10(9) Katepimeron of mesepimeron sharply divided into anterior and posterior areas (Fig. 281). Tergum 1 narrow medially (Fig. 273). Cenchrus about three times wider than long .... ***Monophadnus*** **Hartig** (p. 158)

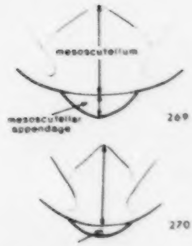
Katepimeron of mesepimeron not clearly divided (Fig. 276). Tergum 1 long medially (Fig. 274). Cenchrus less than twice as wide as long .... ***Monophadnoides*** **Ashmead** (p. 162)

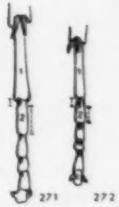
11(9) Hind wing in male with peripheral vein (Fig. 264). Tergum 9 in female small (Fig. 268) .... ***Periclista*** **(*Periclista*) Konow** (p. 161)

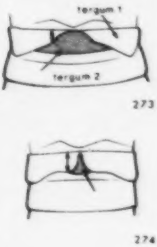
Hind wing in male without peripheral vein. Tergum 9 in female large (Fig. 267) .... ***Periclista*** **(*Neocharactus*) MacGillivray** (p. 162)

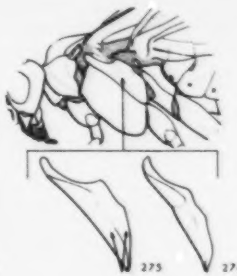
12(7) Length of flagellomere 1, 1.0–1.2 times as long as 2. Flagellomere 6, at least 2.5 times as long as wide or, in adults of few species, less than 2.5 times as long as wide .... Phymatocerini 13

Length of flagellomere 1 about 1.5 times as long as 2. Flagellomere 6, 1.2–2.5 times as long as wide 16









Figs. 269, 270. Mesoscutellar appendage. 269, *Phymatocera fumipennis* (Norton); 270, *Rhadinoceraea insularis* (Kincaid).

Figs. 271, 272. Ventral view of metatarsus. 271, *P. fumipennis*; 272, *Paracharactus rudis* (Norton).

Figs. 273, 274. Abdominal terga 1 (membranous area stippled). 273, *Phymatocera smilacinae* Smith; 274, *Paracharactus rudis*.

Figs. 275, 276. Mesepimeron. 275, *Paracharactus rudis*; 276, *Phymatocera fumipennis*.

13(12) Mesepisternum with large pits. (Epicnemial region not outlined.) .... ***Lagonis* Ross** (p. 158)

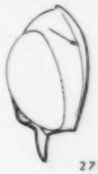
Mesepisternum not pitted 14

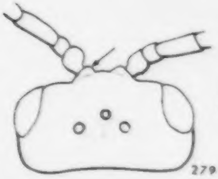
14(13) Epicnemial region not outlined. Mesoscutellar appendage short: medial length less than one-fifth that of mesoscutellum (Fig. 270) .... ***Rhadinoceraea* (*Veratra*) Smith** (p. 157)

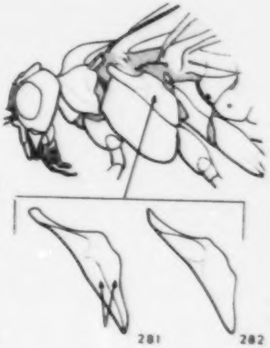
Epicnemial region clearly, weakly, or not (*Paracharactus rudis*) outlined by furrow. Mesoscutellar appendage long: medial length greater than one-quarter that of mesoscutellum (Fig. 269) 15

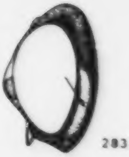
15(14) Membranous area between terga 1 and 2 small: tergum 1 long submedially (Fig. 274). Katepimeron of mesothorax sharply divided into anterior and posterior halves (Fig. 275). Pulvilli in female long: length of pulvillus of metatarsomere 1, two-thirds of distance (or more) between pulvilli of tarsomere 1 and 2 (Fig. 272) .... ***Paracharactus* MacGillivray** (p. 157)

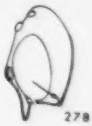
Membranous area between terga 1 and 2 large: tergum 1 short submedially (Fig. 273). Katepimeron of mesothorax not clearly divided into anterior and posterior halves (Fig. 276). Pulvilli in female short: length of pulvillus of metatarsomere 1, one-third of distance (or less) between pulvilli of tarsomeres 1 and 2 (Fig. 271) .... ***Phymatocera* Dahlbom** (p. 156)

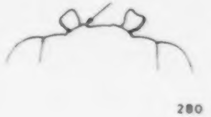


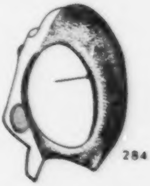












Figs. 277, 278. Lateral view of head. 277, *Eutomostethus ephippium* (Panzer); 278, *Stethomostus fuliginosus* (Schrank).

Figs. 279, 280. Dorsal view of head. 279, *Monardis pulla* Smith; 280, *Apareophora dyari* (Benson).

Figs. 281, 282. Mesepimeron. 281, *Monophadnus pallescens* (Gmelin); 282, *Monardis pulla*.

Figs. 283, 284. Lateral view of head. 283, *Eupareophora parca* (Cresson); 284, *A. dyari*.

16(12) Epicnemial area clearly outlined by furrow .... Phymatocerini 17

Epicnemial area not outlined 18

17(16) Occipital ridge of head in lateral view extended above dorsal limit of eye (Fig. 277); ridge pitted. Mesoscutellar appendage long: medial length 0.25–0.3 that of mesoscutellum (Fig. 269). Body with orange patterns .... ***Eutomostethus* Enslin** (p. 159)

Occipital ridge of head in lateral view outlined near mandible only (Fig. 278); ridge not pitted. Mesoscutellar appendage short: medial length 0.15–0.2 that of mesoscutellum (Fig. 270). Body black .... ***Stethomostus* Benson** (p. 158)

18(16) Inner margin of antennal socket in dorsal view markedly raised (Fig. 279) 19

Inner margin of antennal socket in dorsal view slightly or not raised (Fig. 280) .... Blennocampini 20

19(18) Fore and hind wing darkened. Veins 2A and 3A of fore wing curved up at apex. Tibiae black or dark brown. Pits on mesoscutellum large (about 50 µm in diameter) and clearly outlined. Katepimeron of mesopleuron not divided into anterior and posterior areas (Fig. 282) .... Blennocampini: ***Monardis*** **Enslin** (p. 160)

Fore and hind wing clear. Veins 2A and 3A of fore wing straight. Tibiae straw-colored. Pits of mesoscutellum absent or small (25–30 µm), or small to large and not clearly outlined. Katepimeron of mesopleuron clearly divided into anterior and posterior areas (Fig. 281) .... Phymatocerini: ***Monophadnus*** **Hartig** (p. 158)

20(18) Mesepisternum dull and sculptured. Mesoscutum with fine pits. Head surface rough. Furrow near posterior margin of eye narrow and shallow (Fig. 284) .... ***Apareophora*** **Sato** (p. 160)

Mesepisternum bright and smooth. Mesoscutum not pitted. Head surface smooth. Furrow near posterior margin of eye wide and deep (Fig. 283) .... ***Eupareophora*** **Enslin** (p. 160)

Clé des tribus, des genres et des sous-genres de Blennocampinae

1 Nervures 2A et 3A de l'aile antérieure complètement définies et étroitement reliées à la nervure 1A (fig. 247) .... Lycaotini 2

Nervures 2A et 3A de l'aile antérieure pas complètement définies et non reliées à la nervure 1A (fig. 248) 3

2(1) Pattes noires, aile antérieure de couleur sombre .... ***Lycaota*** **Konow** (p. 155)

Pattes brun rougeâtre, aile antérieure de couleur claire .... ***Blennogeneris*** **MacGillivray** (p. 154)

3(1) Pulville non présent sur les articles 1 et 2 du tarse (fig. 249). Surface ventrale de tous les articles ou de l'un des articles 4 à 7 du flagelle de teinte pâle (surface pâle légèrement sclérotisée et généralement affaissée chez les spécimens desséchés) et chacun de ces articles beaucoup plus petit que l'article 3. Métépimère avec deux sillons ou lignes foncées formant un angle près de la jonction avec le métacoxa (fig. 251). (Griffe du tarse pourvue d'une longue dent subapicale et d'un lobe basal.) .... Waldheimiini 4

Pulville nettement apparent sur les articles 1 et 2 du tarse (fig. 250). Surface ventrale des articles 4 à 7 du flagelle fortement sclérotisée (pas affaissée chez les spécimens desséchés) et presque aussi longue ou légèrement plus courte que l'article 3. Métépimère sans sillon près du métacoxa ou pourvu d'un sillon légèrement courbé près du bord du métacoxa (fig. 253) 5

4(3) Nervures 2A et 3A de l'aile antérieure courbées vers le haut à l'apex (fig. 255). Surface membraneuse entre le mésopleure et le métapleure petite ou absente, parce que le bord postérieur du mésopleure est convexe et le bord antérieur du métépimère légèrement concave (fig. 251) .... ***Halidamia*** **Benson** (p. 163)

Nervures 2A et 3A de l'aile antérieure rectilignes (fig. 254). Surface membraneuse entre le mésopleure et le métapleure grande, parce que le bord postérieur du mésépimère est rectiligne ou légèrement concave et le bord antérieur du métépimère profondément concave (fig. 252) .... ***Erythraspides*** **Ashmead** (p. 163)

5(3) Epicnémium clairement défini par un sillon étroit et situé sur le même plan que le mésépisternum (fig. 256) .... Tomostethini 6

Epicnémium non défini, ou défini par un large sillon, et non situé sur le même plan que le mésépisternum (fig. 257) 7

6(5) Mésonotum fortement pubescent. Mésoscutellum et mésépisternum pourvus de fines fosses. Le 0,2 du clypéus à la base déprimée et dépourvue de soies .... ***Tomostethus*** **Konow** (p. 155)

Mésonotum pourvu de soies éparses principalement dans la partie centrale de chaque sclérite. Mésoscutellum et mésépisternum lisses. Le 0,2 du clypéus à la base non déprimée et presque entièrement couverte de soies .... ***Tethida*** **Ross** (p. 156)

7(5) Griffe du tarse pourvue d'une longue dent préapicale (fig. 258) et épicnémium non défini. Griffe du tarse pourvue (fig. 259) ou non pourvue d'un lobe basal .... Blennocampini 8

Griffe du tarse sans dent préapicale ou pourvue d'une courte dent préapicale (fig. 261), ou avec une longue dent interne et un épicnémium nettement défini. Griffe du tarse non pourvue d'un lobe basal (fig. 260) 12

8(7) Sillon près du bord postérieur de l'oeil large et profond, avec de grandes fosses (fig. 263) .... ***Ardis* Konow** (p. 159)

Sillon près du bord postérieur de l'oeil étroit et peu profond, sans fosses (fig. 262) 9

9(8) Anépimère du mésopleure avec surface membraneuse variant de petite à grande (sauf chez *Periclista marginicollis*) (fig. 265). Nervures 2A et 3A de l'aile antérieure courbées vers le haut à l'apex (fig. 255) .... ***Periclista* Konow** 11

Anépimère du mésopleure sans surface membraneuse (fig. 266). Nervures 2A et 3A de l'aile antérieure rectilignes à l'apex (fig. 254) 10

10(9) Catépimère du mésopleure profondément divisé en régions antérieure et postérieure (fig. 281). Tergum 1 étroit en partie médiane (fig. 273). Cenchrus approximativement trois fois plus large que long .... ***Monophadnus* Hartig** (p. 158)

Catépimère du mésopleure pas nettement divisé (fig. 276). Tergum 1 long en partie médiane (fig. 274). Cenchrus moins de deux fois plus large que long .... ***Monophadnoides* Ashmead** (p. 162)

11(9) Présence d'une nervure périphérique dans l'aile postérieure du mâle (fig. 264). Tergum 9 de la femelle petit (fig. 268) .... ***Periclista (Periclista)* Konow** (p 161)

Absence de nervure périphérique dans l'aile postérieure du mâle. Tergum 9 de la femelle grand (fig. 267) .... ***Periclista (Neocharactus)* MacGillivray** (p. 162)

12(7) Longueur de l'article 1 du flagelle de 1,0 à 1,2 fois celle de l'article 2. Article 6 du flagelle au moins 2,5 fois plus long que large, ou, chez les adultes de quelques espèces, moins de 2,5 fois plus long que large .... Phymatocerini 13

Longueur de l'article 1 du flagelle approximativement 1,5 fois celle de l'article 2. Article 6 du flagelle de 1,2 à 2,5 fois plus long que large 16

13(12) Mésépisternum pourvu de larges fosses. (Epicnémium non défini) .... ***Lagonis* Ross** (p. 158)

Mésépisternum non ponctué 14

14(13) Epicnémium non défini. Appendice mésoscutellaire court : longueur médiane inférieure au cinquième de celle du mésoscutellum (fig. 270) .... ***Rhadinoceraea*** **(*Veratra*) Smith** (p. 157)

Epicnémium nettement, faiblement, ou non défini (*Paracharactus rudis*) par un sillon. Appendice mésoscutellaire long : longueur médiane supérieure au quart de celle du mésoscutellum (fig. 269) 15

15(14) Surface membraneuse entre les terga 1 et 2 petite : tergum 1 long dans la partie sous-médiane (fig. 274). Catépimère du mésothorax profondément divisé en moitiés antérieure et postérieure (fig. 275). Pulvilles de la femelle longs : longueur du pulville de l'article 1 du métatarse, au moins les deux tiers de la distance entre les pulvilles des articles 1 et 2 du tarse (fig. 272) .... ***Paracharactus*** **MacGillivray** (p. 157)

Surface membraneuse entre les terga 1 et 2 grande : tergum 1 court dans la partie sous-médiane (fig. 273). Catépimère du mésothorax pas nettement divisé en moitiés antérieure et postérieure (fig. 276). Pulvilles de la femelle courts : longueur du pulville de l'article 1 du métatarse, au plus un tiers de la distance entre les pulvilles des articles 1 et 2 du tarse (fig. 271) .... ***Phymatocera*** **Dahlbom** (p. 156)

16(12) Epicnémium nettement défini par un sillon .... Phymatocerini 17

Epicnémium non défini 18

17(16) En vue latérale, carène occipitale de la tête se prolongeant au-dessus de la limite dorsale de l'oeil (fig. 277); carène ponctuée. Appendice mésoscutellaire long : longueur médiane de 0,25 à 0,3 fois celle du mésoscutellum (fig. 269). Corps à motif orange .... ***Eutomostethus*** **Enslin** (p. 159)

En vue latérale, carène occipitale de la tête visible près de la mandibule seulement (fig. 278); carène non ponctuée. Appendice mésoscutellaire court : longueur médiane de 0,15 à 0,2 fois celle du mésoscutellum (fig. 270). Corps noir .... ***Stethomostus*** **Benson** (p. 158)

18(16) Bord interne de la cavité antennaire nettement surélevé en vue dorsale (fig. 279) 19

Bord interne de la cavité antennaire peu ou pas surélevé en vue dorsale (fig. 280) .... Blennocampini 20

19(18) **Ailes antérieures et postérieures de teinte sombre. Nervures 2A et 3A de l'aile antérieure courbées vers le haut à l'apex. Tibias noirs ou brun foncé. Fosses du mésoscutellum grandes (environ 50 µm de diamètre) et nettement définies. Catépimère du mésopleure non divisé en régions antérieure et postérieure (fig. 282) .... Blennocampini : *Monardis* Enslin (p. 160)**

Ailes antérieures et postérieures de teinte claire. Nervures 2A et 3A de l'aile antérieure rectilignes. Tibias de couleur paille. Fosses du mésoscutellum absentes ou petites (de 25 à 30 µm), ou variant de petites à grandes et pas nettement définies. Catépimère du mésopleure nettement divisé en régions antérieure et postérieure (fig. 281) .... Phymatocerini : ***Monophadnus* Hartig** (p. 158)

20(18) Mésépisternum terne et sculpté. Mésoscutum ponctué. Surface de la tête rugueuse. Sillon près du bord postérieur de l'oeil étroit et peu profond (fig. 284) .... ***Apareophora* Sato** (p. 160)

Mésépisternum brillant et lisse. Mésoscutum non ponctué. Surface de la tête lisse. Sillon près du bord postérieur de l'oeil large et profond (fig. 283) .... ***Eupareophora* Enslin** (p. 160)

Tribe Lycaotini

Diagnosis. Adults of Lycaotini are distinguished from those of other tribes of the subfamily by veins 2A and 3A of the fore wing, which are completely outlined and fused for a short distance.

Diversity. The tribe consists of nine genera found in Eurasia and North and South America (Smith 1973). In North America two genera and six species are known (mainly west of the Rocky Mountains) (Smith 1979*a*). In Canada two genera and three species are recorded.

Genus *Blennogeneris* MacGillivray

Diagnosis. Adults of *Blennogeneris* are distinguished from those of *Lyacota* by the clear wings and the reddish brown legs.

Diversity. The genus consists of three species and is restricted to North America (Smith 1969*c*). In Canada two species are recorded, but three are expected.

Host. Larvae of one species form bud galls on *Symphoricarpos* (Smith 1969c).

Comments. Smith (1969c) revised the species of the genus.

Genus *Lycaota* Konow

Diagnosis. Adults of *Lycaota* are distinguished from those of *Blennogeneris* by the darkened fore wings and the black legs.

Diversity. The genus consists of three species and is restricted to North America (Smith 1969). In Canada one species, *L. sodalis* (Cresson), is recorded.

Comments. Smith (1969c) revised the species of the genus.

Tribe Tomostethini

Diagnosis. Adults of Tomostethini are distinguished from those of other tribes of the subfamily by the well-developed pulvilli on tarsomeres 1 and 2 and by the sharply outlined epicnemial area.

Diversity. The tribe is recorded in Eurasia and North America (Smith 1969c). In North America the tribe consists of two genera and two species (Smith 1969c).

Genus *Tomostethus* Konow

Diagnosis. Adults of *Tomostethus* are distinguished from those of other North American genera of the tribe by the depressed and hairless basal 0.2 of the clypeus.

Diversity. The genus consists of about 12 species mainly centred in eastern Asia (Smith 1969c). In North America, including Canada, one species, *T. multicinctus* (Rohwer), is known (Smith 1979*a*).

Host. Larvae feed on ashes (Smith 1979*a*).

Comments. Smith (1969*c*) characterized the single North American species of the genus.

Genus *Tethida* Ross

Diagnosis. Adults of *Tethida* are distinguished from those of *Tomostethus* by the densely pubescent mesonotum.

Diversity. The genus consists of a single eastern North American species, *T. barba* (Say) (Smith 1979*a*).

Host. Larvae feed on ashes (Smith 1979*a*)

Comments. Smith (1969*c*) characterized the single species of the genus.

Tribe Phymatocerini

Diagnosis. Adults of Phymatocerini are difficult to define on external character states and are best defined by the character combination given by Smith (1969*c*).

Diversity. The tribe is known in Eurasia and North America (Benson 1952; Smith 1969*c*). In North America seven genera and 27 species are known (Smith 1979*a*). In Canada seven genera and 18 species are recorded, but 20 species are expected.

Genus *Phymatocera* Dahlbom

Diagnosis. Adults of *Phymatocera* are distinguished from those of other genera of the subfamily by the combination of characters in the key.

Diversity. The genus consists of seven species from Eurasia and North America (Smith 1969*c*). The genus is most diverse in North America. In North America, including Canada, five species are known (Smith 1979*a*).

Host. Larvae feed on various species of *Smilacina* (Smith 1969*c*).

Comments. Goulet (1981) characterized males and females of the North American species of the genus. Smith (1969*c*) characterized the North American species mainly on female characters.

Genus *Paracharactus* MacGillivray

Diagnosis. Adults of *Paracharactus* are distinguished from those of other genera of the subfamily by the combination of characters in the key.

Diversity. The genus consists of seven species found throughout Eurasia and North America (Smith 1969c). In North America three species are known (Smith 1979*a*). In Canada two species are recorded, but three are expected.

Host. Larvae of some Eurasian species feed on members of the iris and lily families (Benson 1952).

Comments. Smith (1969c) revised the North American species of the genus.

Genus *Rhadinoceraea* Konow

Diagnosis. Adults of *Rhadinoceraea* are distinguished from those of other North American genera of the subfamily by the combination of characters in the key.

Diversity. The genus consists of at least 12 species found throughout Eurasia and North America (Smith 1969c). In North America nine species are known (Smith 1969c, 1990). In Canada three species are recorded.

Host. Larvae feed on *Calochortus*, *Zigadenus*, and *Veratrum* (Smith 1969c, 1990).

Comments. Smith (1969c) revised the North American species of the genus. Smith (1990) added one more species living on *Zigadenus*.

Subgenus *Veratra* Smith

Diagnosis. Adults of *Veratra* are distinguished from those of *Rhadinoceraea* by the absence of an inner tooth on the claw.

Diversity. The subgenus consists of five species found in Eurasia and mainly in North America (Smith 1969c). In North America five species are known (Smith 1969c, 1990). In Canada three species are recorded.

Host. Larvae feed on *Veratrum* (Smith 1969c).

Comments. Smith (1969c) revised the North American species of the genus.

Genus *Lagonis* Ross

Diagnosis. Adults of *Lagonis* are distinguished from those of other genera of the subfamily by the large punctures on the mesepisternum and the mesoscutellum.

Diversity. The genus consists of two species, one in Eurasia and *L. nevadensis* (Cresson) in North America (Smith 1969c). In North America, including Canada, *L. nevadensis* is found in the Rocky Mountains and westward (Smith 1969c).

Host. Larvae feed on elderberry (Smith 1969c).

Comments. Smith (1969c) characterized the single North American species of the genus.

Genus *Monophadnus* Hartig

Diagnosis. Adults of *Monophadnus* are distinguished from those of other genera of the subfamily by the combination of characters in the key.

Diversity. The genus consists of 13 species found throughout Eurasia and North America (Smith 1969c). In North America seven species are known (Smith 1969c). In Canada four species are recorded, but five are expected.

Host. Larvae feed on buttercups (Smith 1969c).

Comments. Smith (1969c) revised the North American species of the genus.

Genus *Stethomostus* Benson

Diagnosis. Adults of *Stethomostus* are distinguished from those of other North American genera of the tribe by the combination of characters in the key.

Diversity. The genus consists of two species found in Eurasia and North America (Smith 1969c). In eastern North America, including Canada, one introduced species, *S. fuliginosus* (Shrank), is known (Smith 1969c).

Host. Larvae feed on buttercups (Smith 1969c).

Comments. Smith (1969c) characterized the single North American species of the genus.

Genus *Eutomostethus* Enslin

Diagnosis. Adults of *Eutomostethus* are distinguished from those of other North American genera of the subfamily by the combination of characters in the key.

Diversity. The genus consists of 25–30 species found across Eurasia and North America (Smith 1969c). Eastern Asia is the region of greatest diversity (Smith 1969c). In North America, including Canada, two species are known (Smith 1969c).

Host. Larvae feed on *Poa* and other soft grasses, as well as on rushes (Smith 1969c).

Comments. Smith (1969c) revised the North American species of the genus.

Tribe Blennocampini

Diagnosis. Adults of Blennocampini are difficult to define by external character states and are best distinguished by the combination of characters in Smith (1969c).

Diversity. The tribe's range extends throughout Eurasia and North America (Smith 1969c). In North America six genera and 33 species are known (Smith 1969c). In Canada six genera and 18 species are recorded, but 22 species are expected.

Genus *Ardis* Konow

Diagnosis. Adults of *Ardis* are distinguished from other North American genera of the family by the large and pitted groove along the posterior margin of the eye.

Diversity. The genus consists of three species found throughout Eurasia and North America (Smith 1969c). In North America and in Canada two species are recorded (Smith 1969c).

Host. Larvae are shoot borer of roses (Smith 1969c).

Comments. Smith (1969c) revised the North American species of the genus.

Genus *Monardis* Enslin

Diagnosis. Adults of *Monardis* are distinguished from those of other North American genera of the subfamily by the combination of characters in the key.

Diversity. The genus consists of two species found in Eurasia and North America (Smith 1969c). In central and western North America, including Canada, one species, *M. pulla* Smith, is recorded (Smith 1969c).

Comments. Smith (1969c) characterized the single North American species of the genus.

Genus *Apareophora* Sato

Diagnosis. Adults of *Apareophora* are distinguished from those of other North American genera of the subfamily by the combination of characters in the key.

Diversity. The genus consists of six species found in eastern Asia and North America (Smith 1969). In eastern North America, including Canada, two species are known (Smith 1969c).

Host. Larvae feed on spirea (Smith 1969c).

Comments. Smith (1969c) characterized the North American species of the genus.

Genus *Eupareophora* Enslin

Diagnosis. Adults of *Eupareophora* are distinguished from those of other North American genera of the family by the deep and smooth groove along the ventral half of the posterior margin of the eye.

Diversity. The genus consists of two species found in Europe and North America (Smith 1969c). In North America, including Canada, *E. parca* (Cresson) is the only species known (Smith 1969c).

Host. Larvae feed on hickory, ash, and perhaps *Chionanthus* (Smith 1969c).

Comments. Smith (1969c) characterized the single North American species of the genus.

Genus *Periclista* Konow

Diagnosis. Adults of the genus *Periclista* are distinguished from those of other North American genera of the subfamily by the small membranous surface on the anepimeron of the mesothorax, except for adults of *P. marginicollis* (Norton), which are best characterized by the combination of characters in the key.

Diversity. The genus consists of 23 species found throughout Eurasia and North America (Smith 1969c). The genus is especially diverse in North America, where 19 species are known (Smith 1969c). In Canada five species are recorded, but nine species are expected.

Host. Larvae feed almost exclusively on oak, though those of one species also feed on hickory (Smith 1969c).

Comments. Stannard (1949) revised the North American species of the genus. Smith (1969c) characterized one additional species.

Subgenus *Periclista* Konow

Diagnosis. Adults of the subgenus *Periclista* are distinguished from those of the subgenus *Neocharactus* by the presence of a peripheral vein in the hind wing in the male and by the rather long tergum 9 of the female in lateral view.

Diversity. The subgenus consists of 19 species found in Eurasia and North America (Smith 1969c). In North America 15 species are known (Smith 1969c). In Canada five species are recorded, but six are expected.

Comments. See genus *Periclista*.

Subgenus *Neocharactus* MacGillivray

Diagnosis. Adults of *Neocharactus* are distinguished from those of *Periclista* by the absence of a peripheral vein on the hind wing of the male and by the relatively short tergum 9 of the female in lateral view.

Diversity. The subgenus consists of four species restricted to North America (Smith 1969c). In Canada no species are recorded, but two are expected.

Comments. See genus *Periclista*.

Genus *Monophadnoides* Ashmead

Diagnosis. Adults of *Monophadnoides* are distinguished from those of other North American genera of the subfamily by the combination of characters in the key.

Diversity. The genus consists of about 20 species from Eurasia and North America (Smith 1969c). In North America, including Canada, seven species are recorded (Smith 1969c).

Host. Larvae feed on *Rubus* (Smith 1969c).

Comments. Smith (1969c) revised the North American species of the genus.

Tribe Waldheimiini

Diagnosis. Adults of Waldheimiini are distinguished from those of other North American genera of the subfamily by the absence of pulvillus on tarsomeres 1 and 2 and by the presence of a divergent furrow on the metepisternum near the metacoxa.

Diversity. The tribe occurs around the world but is especially diverse in South and Central America (Smith 1969c). In North America three genera are known (Smith 1969c), and in Canada two are recorded.

Genus *Erythraspides* Ashmead

Diagnosis. Adults of *Erythraspides* are distinguished from those of other genera of the tribe by the straight veins 2A and 3A of the fore wing.

Diversity. The genus consists of 12 species from Africa, Mexico, and South America (Smith 1969c). In North America two species are known (Smith 1969c). In Canada one species is recorded, but two are expected.

Host. Larvae feed on primroses and grapes (Smith 1969c).

Comments. Smith (1969c) revised the North American species of the genus.

Genus *Halidamia* Benson

Diagnosis. Adults of *Halidamia* are distinguished from those of other North American genera of the tribe by the curved apex of veins 2A and 3A of the fore wing.

Diversity. The genus consists of one species, *H. affinis* (Fallen), found in Eurasia and introduced in eastern North America (Smith 1969c).

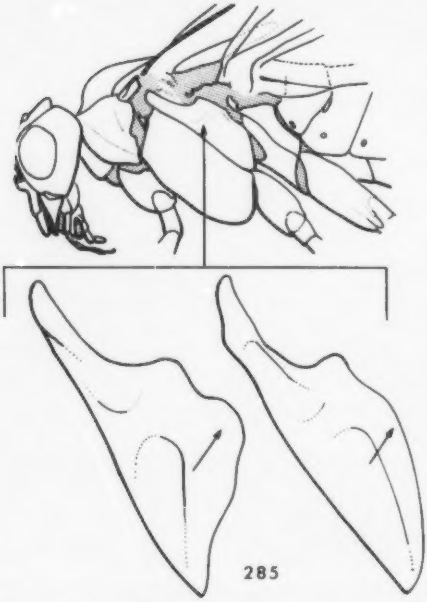
Host. Larvae feed on *Galium* (Smith 1969c).

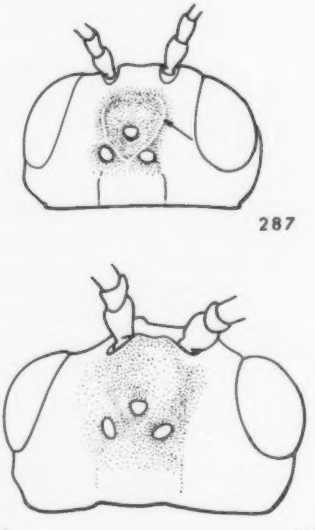
Comments. Smith (1969c) characterized the single species of the genus.

Subfamily Allantinae

Diagnosis. Adults of Allantinae are distinguished from those of other subfamilies of Tenthredinidae by the fore wing veins 1m-cu and Cu_1, which form an angle of 140–150°; by the short distance of the fore wing vein R between junctions of veins M and Rs+M; and by veins 2A and 3A, which are completely outlined and clearly constricted in the basal cell.

Diversity. A diverse assemblage of genera are recorded from Eurasia and from North and South America (Benson 1952; Smith 1979*b*). The range of the subfamily extends throughout temperate, boreal, and southern arctic regions. In North America 14 genera and 63 species are known (Smith 1979*b*). In Canada 12 genera and 50 species are recorded, but 57 species are expected.





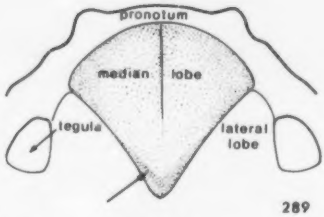
Figs. 285, 286. Mesepimeron. 285, *Dimorphopteryx abnormis* Rohwer; 286, *Taxonus terminalis* (Say).

Figs. 287, 288. Dorsal view of head (ocellar area stippled). 287, *Eriocampa ovata* (Linnaeus); 288, *D. abnormis*.

Key to tribes and genera of Allantinae

1 Pits of mesepisternum and mesoscutellum dense and large over surface. Katepimeron of mesopleuron much enlarged in posterior half (Fig. 285) .... Eriocampini 2

Pits of mesepisternum and mesoscutellum scattered and small or absent and surface smooth or rough. Katepimeron of mesopleuron slightly enlarged in posterior half (Fig. 286) 4



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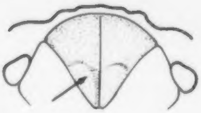

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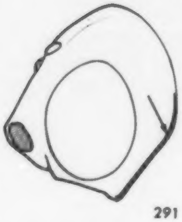

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Figs. 289, 290. Median lobe of mesoscutum (stippled). 289, *Dimorphopteryx abnormis* Rohwer; 290, *Eriocampa ovata* (Linnaeus).
Fig. 291. Lateral view of head of *D. abnormis*.

2(1) Median ocellus surrounded by sharp ridges (Fig. 287). Posterior half of median lobe depressed into a distinct flat surface (Fig. 290). Abdomen black. Pulvillus developed on tarsomeres 3 and 4 only .... ***Eriocampa*** **Hartig** (p. 172)

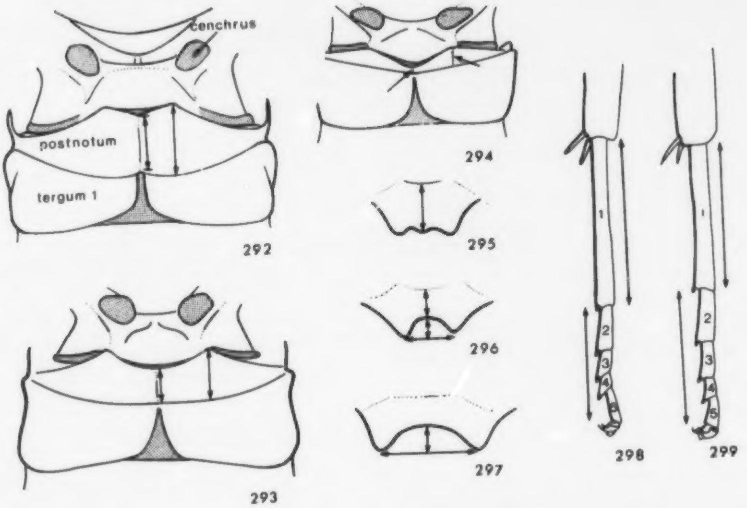
Median ocellus not surrounded by sharp ridges (Fig. 288). Posterior half of median lobe convex, not depressed, and continuous with anterior half (Fig. 289). Abdomen with some pale segments. Pulvillus developed on tarsomeres 1–4 3

3(2) Occipital ridge of head in lateral view developed only near mandible. Pits of mesoscutum and head dense. Femora mainly black and tergum 1 white or reddish brown .... ***Pseudosiobla*** **Ashmead** (p. 172)

Occipital ridge of head in lateral view developed from mandible to ocellar furrow (Fig. 291). Pits of mesoscutum and head scattered. Femora mostly reddish brown and tergum 1 completely black .... ***Dimorphopteryx*** **Ashmead** (p. 173)

4(1) Medial length of postnotum of metathorax 0.8 or more of maximal length of postnotum, about halfway between side and midline (Fig. 292). Mesepisternum pitted or surface roughened in dorsal half. Anterior margin of clypeus widely concave (Fig. 297) .... Allantini 5

Medial length of postnotum of metathorax 0.7 or less of maximal length of postnotum, halfway between side and midline (Figs. 293–294). Mesepisternum not pitted and surface smooth or sculptured. Anterior margin of clypeus less widely concave than above (Figs. 295–296) .... Empriini 7

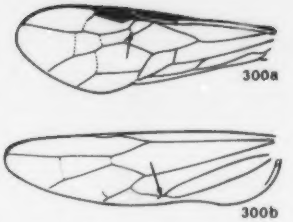


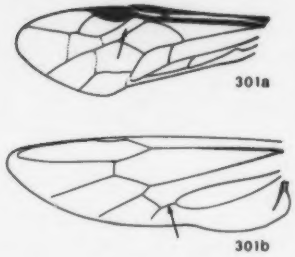
Figs. 292–294. Metathoracic postnotum. 292, *Taxonus terminalis* (Say); 293, *Aphilodyctium fidum* (Cresson); 294, *Phrontosoma belfragei* (Cresson).
Figs. 295–297. Clypeus. 295, *Ametastegia pallipes* (Spinola); 296, *Aphilodyctium fidum*; 297, *Macremphytus tarsatus* (Say).
Figs. 298, 299. Lateral view of metatarsus. 298, *M. tarsatus*; 299, *Allantus cinctus* (Linnaeus).

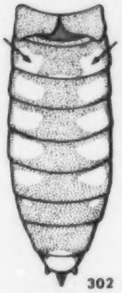
5(4) Mesoscutellar appendage without setae. Pedicel clearly longer than wide. First free sector of vein Rs of fore wing present (Fig. 300*a*). Vein at apex of anal cell of hind wing in female absent or very short (Fig. 300*b*) .... ***Taxonus* Hartig** (p. 177)

Mesoscutellar appendage with setae. Pedicel as wide as or wider than long. First free sector of vein Rs of fore wing absent (Fig. 301*a*). Vein at apex of anal cell of hind wing in female clearly developed (Fig. 301*b*) 6

6(5) Antenna bicolored or tricolored: at least scape and pedicel clearly different in color from flagellomeres 4–7. Mesepisternum clearly pitted. Length of metatarsomere 1, 1.2 times that of combined 2–5 (Fig. 298). Cell M of hind wing closed (Fig. 308) .... ***Macremphytus* MacGillivray** (p. 177)







Figs. 300, 301. Fore wings (*a*) and hind wings (*b*). 300, *Taxonus borealis* MacGillivray; 301, *Allantus cinctus* (Linnaeus).
Fig. 302. Dorsal view of abdomen of *Empria multicolor* (Norton).

Antenna concolored and black. Mesepisternum markedly roughened in dorsal half but not pitted. Length of metatarsomere 1, 0.9 times or less that of combined 2–5 (Fig. 299). Cell M of hind wing open (Fig. 307) .... ***Allantus*** **Panzer** (p. 176)

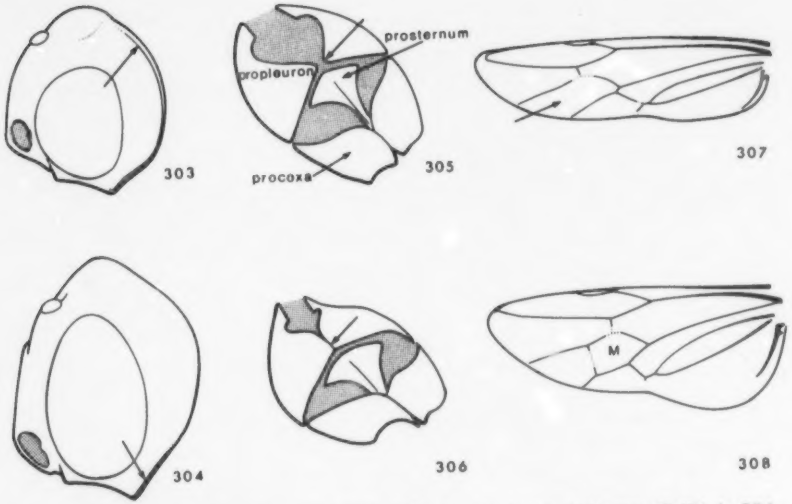
7(4) Terga 2–5 each with pair of pale spots (Fig. 302). Minimum malar space in female 0.5–1.2, or in male 0.5–0.7, times as long as diameter of antennal socket .... ***Empria*** **Lepeletier** (p. 173)

Terga 2–5 without spots. Minimum malar space in female 0.3–0.5, or in male 0.2–0.4, times as long as diameter of antennal socket 8

8(7) Posterior margin of head in lateral view with ridge extended from mandible to at least level of dorsal margin of eye (Fig. 303). Medial length of postnotum of metathorax 0.5–0.7 of maximum length of postnotum halfway between side and midline (Fig. 293) 9

Posterior margin of head in lateral view without occipital ridge or ridge developed only near mandible (Fig. 304). Medial length of postnotum of metathorax 0.2–0.3 of maximum length of postnotum halfway between side and midline (Fig. 294) 11

9(8) Flagellomere 1, 1.0–1.2 times as long as 2. Mesoscutellar appendage smooth. Postocellar area about 1.5 times wider than long. Hind wing without M cell (Fig. 307). Cercus in female 1.5–2.0 times as long as wide 10



Figs. 303, 304. Lateral view of head. 303, *Ametastegia glabrata* (Fallén); 304, *Phrontosoma belfragei* (Cresson).
Figs. 305, 306. Ventral view of prothorax. 305, *P. belfragei*; 306, *Monostegia abdominalis* (Fabricius).
Figs. 307, 308. Hind wing. 307, *A. glabrata*; 308, *Monosoma inferentia* (Norton).

Flagellomere 1, 1.5 times as long as 2. Mesoscutellar appendage sculptured. Postocellar area about as long as wide. Hind wing with M cell (Fig. 308). Cercus in female four to five times as long as wide .... ***Monosoma* Viereck** (p. 174)

10(9) Anterior margin of clypeus circularly concave: depth of concavity 0.5 to 1.0 of medial length of clypeus (Fig. 296). Anal crossvein of fore wing oblique. Female with dense setae on metascutellum .... ***Aphilodyctium* Ashmead** (p. 175)

Anterior margin of clypeus almost sligthly concave: depth of concavity 0.3 of medial length of clypeus (Fig. 295). Anal crossvein of fore wing almost perpendicular. Female with scattered setae on metascutellum .... ***Ametastegia* Costa** (p. 175)

11(8) Mesoscutellar appendage without setae. Posterior third of mesoscutellum clearly pitted. Postocellar area twice as wide as long. Occipital ridge on posterior margin of head in lateral view developed near mandible only (Fig. 304). Propleura not touching at midline on ventral surface (Fig. 305) .... ***Phrontosoma* MacGillivray** (p. 174)

Mesoscutellar appendage with numerous setae. Mesoscutellum not pitted. Postocellar area slightly wider than long. Occipital ridge on posterior margin of postocular area in lateral view absent. Propleura touching at midline on ventral surface (Fig. 306) ...... ***Monostegia*** **Costa** (p. 174)

Clé des tribus et des genres d'Allantinae

1 Fosses à la surface du mésépisternum et du mésoscutellum denses et grandes. Catépimère du mésopleure très élargi dans la moitié postérieure (fig. 285) .... Eriocampini 2

Fosses du mésépisternum et du mésoscutellum éparses et petites, ou absentes et surface lisse ou rugueuse. Catépimère du mésopleure légèrement élargi dans la moitié postérieure (fig. 286) 4

2(1) Ocelle médian entouré de carènes tranchantes (fig. 287). Moitié postérieure du lobe médian déprimée et formant une surface aplatie distincte (fig. 290). Abdomen noir. Pulville présent sur les articles 3 et 4 du tarse seulement .... ***Eriocampa*** **Hartig** (p. 172)

Ocelle médian non entouré de carènes tranchantes (fig. 288). Moitié postérieure du lobe médian convexe, non déprimée, et en continuité avec la moitié antérieure (fig. 289). Abdomen pourvu de quelques segments de couleur pâle. Pulville présent sur les articles 1 à 4 du tarse 3

3(2) En vue latérale, carène occipitale de la tête visible seulement près de la mandibule. Fosses du mésoscutum et de la tête denses. Fémur principalement noir et tergum 1 blanc ou brun rougeâtre .... ***Pseudosiobla*** **Ashmead** (p. 172)

En vue latérale, carène occipitale de la tête visible de la mandibule au sillon ocellaire (fig. 291). Fosses du mésoscutum et de la tête éparses. Fémur presque entièrement brun rougeâtre et tergum 1 complètement noir .... ***Dimorphopteryx*** **Ashmead** (p. 173)

4(1) Longueur médiane du postnotum du métathorax égale ou supérieure à 0,8 fois la longueur maximale du postnotum, environ à mi-chemin entre le côté et la ligne médiane (fig. 292). Mésépisternum ponctué ou à surface rugueuse dans la moitié dorsale. Bord antérieur du clypéus largement concave (fig. 297) .... Allantini 5

Longueur médiane du postnotum du métathorax égale ou inférieure à 0,7 fois la longueur maximale du postnotum, à mi-chemin entre le côté et la ligne médiane (fig. 293, 294). Mésépisternum non ponctué et surface lisse ou sculptée. Bord antérieur du clypéus moins largement concave que ci-dessus (fig. 295, 296) .... Empriini 7

5(4) Appendice mésoscutellaire dépourvu de soies. Pédicelle nettement plus long que large. Premier secteur libre de la nervure Rs de l'aile antérieure présent (fig. 300*a*). Nervure à l'apex de la cellule anale de l'aile postérieure absente chez la femelle ou très courte (fig. 300*b*) .... ***Taxonus*** **Hartig** (p. 177)

Appendice mésoscutellaire pourvu de soies. Pédicelle aussi large ou plus large que long. Premier secteur libre de la nervure Rs de l'aile antérieure absent (fig. 301*a*). Nervure à l'apex de la cellule anale de l'aile postérieure nettement visible chez la femelle (fig. 301*b*) 6

6(5) Antenne bicolore ou tricolore : au moins le scape et le pédicelle d'une couleur nettement différente de celle des articles 4 à 7 du flagelle. Mésépisternum nettement ponctué. Longueur de l'article 1 du métatarse 1,2 fois les longueurs combinées des articles 2 à 5 (fig. 298). Cellule M de l'aile postérieure fermée (fig. 308) .... ***Macremphytus*** **MacGillivray** (p. 177)

Antenne complètement noire. Mésépisternum nettement rugueux dans la moitié dorsale mais non ponctué. Longueur de l'article 1 du métatarse égale ou inférieure à 0,9 fois les longueurs combinées des articles 2 à 5 (fig. 299). Cellule M de l'aile postérieure ouverte (fig. 307) .... ***Allantus*** **Panzer** (p. 176)

7(4) Terga 2 à 5 portant chacun une paire de taches pâles (fig. 302). Surface malaire minimale de 0,5 à 1,2 fois la longueur du diamètre de la cavité antennaire chez la femelle, ou de 0,5 à 0,7 fois la longuer chez le mâle .... ***Empria*** **Lepeletier** (p. 173)

Terga 2 à 5 sans taches. Surface malaire minimale 0,3 à 0,5 fois la longueur du diamètre de la cavité antennaire chez la femelle, ou 0,2 à 0,4 fois la longueur chez le mâle 8

8(7) Bord postérieur de la tête, en vue latérale, pourvu d'une carène s'étendant au moins de la mandibule au bord dorsal de l'oeil (fig. 303). Longueur médiane du postnotum du métathorax de 0,5 à 0,7 fois la longueur maximale du postnotum mesurée à mi-chemin entre le côté et la ligne médiane (fig. 293) 9

Bord postérieur de la tête, en vue latérale, sans carène occipitale ou avec une carène visible seulement près de la mandibule (fig. 304). Longueur médiane du postnotum du métathorax, de 0,2 à 0,3 fois la longueur maximale du postnotum prise à mi-chemin entre le côté et la ligne médiane (fig. 294) 11

9(8) Article 1 du flagelle, 1,0 à 1,2 fois plus long que l'article 2. Appendice mésoscutellaire lisse. Région postocellaire environ 1,5 fois plus large que longue. Aile postérieure sans cellule M (fig. 307). Cerque de 1,5 à 2,0 fois plus long que large chez la femelle 10

Article 1 du flagelle, 1,5 fois plus long que l'article 2. Appendice mésoscutellaire sculpté. Région postocellaire presque aussi longue que large. Aile postérieure avec cellule M (fig. 308). Cerque de quatre à cinq fois plus long que large chez la femelle .... ***Monosoma*** **Viereck** (p. 174)

10(9) Bord antérieur du clypéus présentant une concavité circulaire : profondeur de la cavité de 0,5 à 1,0 fois la longueur médiane du clypéus (fig. 296). Nervure transversale de l'aile antérieure oblique. Métascutellum de la femelle pourvu de soies denses .... ***Aphilodyctium*** **Ashmead** (p. 175)

Bord antérieur du clypéus à peine concave : profondeur de la cavité 0,3 fois la longueur médiane du clypéus (fig. 295). Nervure transversale de l'aile antérieure presque perpendiculaire. Métascutellum de la femelle pourvu de soies dispersées .... ***Ametastegia*** **Costa** (p. 175)

11(8) Appendice mésoscutellaire dépourvu de soies. Tiers postérieur du mésoscutellum nettement ponctué. Région postocellaire deux fois plus large que longue. Carène occipitale du bord postérieur de la tête visible seulement près de la mandibule en vue latérale (fig. 304). Propleure ne se rejoignant pas à la ligne médiane de la surface ventrale (fig. 305) .... ***Phrontosoma*** **MacGillivray** (p. 174)

Appendice mésoscutellaire garni de nombreuses soies. Mésoscutellum non ponctué. Région postocellaire légèrement plus large que longue. Carène occipitale du bord postérieur de la région postocellaire absente en vue latérale. Propleure se rejoignant à la ligne médiane de la surface ventrale (fig. 306) .... ***Monostegia*** **Costa** (p. 174)

Tribe Eriocampini

Diagnosis. Adults of *Eriocampini* are distinguished from those of other North American tribes of the subfamily by the large pits, which are dense over the mesepisternum and the mesoscutellum.

Diversity. The tribe is small, with genera found in temperate portions of Eurasia and North America (Smith 1979*b*). In North America three genera and nine species are known (Smith 1979*b*). In Canada three genera and seven species are recorded but eight species are expected.

Genus *Pseudosiobla* Ashmead

Diagnosis. Adults of *Pseudosiobla* are distinguished from those of other North American genera of the subfamily by the dense punctures on the mesoscutum and by the partly pale pattern of the abdominal terga.

Diversity. The genus consists of two Nearctic species (Smith 1979*b*). In Canada one species is recorded, but two are expected in southeastern regions.

Host. Larvae feed on *Cephalanthus* (Smith 1979*b*).

Comments. Smith (1979*b*) revised the species of the genus.

Genus *Eriocampa* Hartig

Diagnosis. Adults of *Eriocampa* are distinguished from those of other North American genera of the subfamily by the posterior half of the median lobe, which is depressed and sharply set apart from the anterior half as a flat surface.

Diversity. The genus consists of 10 species in Eurasia and North America (Smith 1979*b*). In North America and Canada two species are known (Smith 1979*b*).

Host. Larvae feed on walnuts and alders (Smith 1979*b*).

Comments. Smith (1979*b*) revised the North American species of the genus.

Genus *Dimorphopteryx* Ashmead

Diagnosis. Adults of *Dimorphopteryx* are distinguished from those of other North American genera of the subfamily by the scattered pits on the mesoscutum and by the partly pale pattern of the abdominal terga.

Diversity. The genus consists of five North American species (Smith 1979*b*). In Canada four species are recorded. The range of the genus is restricted to regions east of the Rocky Mountains (Smith 1979*b*).

Host. Larvae feed on cherry, plum, pear, apple, serviceberry, hawthorn, birch, oak, alder, and buckeye (Smith 1979*b*).

Comments. Smith (1979*b*) revised the species of the genus.

Tribe Empriini

Diagnosis. Adults of Empriini are distinguished from those of other North American tribes of the subfamily by the short postnotum of the metathorax medially and by the absence of punctures on the mesepisternum.

Diversity. This is a moderately diverse tribe, with a range extending throughout the temperate, boreal, and southern arctic regions of Eurasia and North America (Smith 1979*b*).

Genus *Empria* Lepeletier

Diagnosis. Adults of *Empria* are distinguished from those of other North American genera of the family by a pair of pale spots (usually white in dried specimens) on the basal abdominal terga.

Diversity. The genus consists of about 35 species found throughout Eurasia and North America (Smith 1979*b*). In North America 12 species are known (Smith 1979*b*, 1980), and in Canada 10 are recorded.

Host. Larvae feed on leaves of birch, hazelnut, willow(?), strawberry, *Potentilla*, *Rubus*, rose, and alder (Smith 1979*b*).

Comments. Smith (1979*b*, 1980) revised the North American species of the genus.

Genus *Phrontosoma* MacGillivray

Diagnosis. Adults of *Phrontosoma* are distinguished from those of other North American genera of the tribe by the concolorous abdominal terga, by the short medial length of the metathoracic postnotum, and by the presence of pits on the mesoscutellum.

Diversity. The genus consists of three North American species, all of which are found in Canada (Smith 1979*b*). The range of the genus is restricted to regions east of the Rocky Mountains (Smith 1979*b*).

Host. Larvae of one species feed on dogwood (Smith 1979*b*).

Comments. Smith (1979*b*) revised the species of the genus.

Genus *Monosoma* MacGillivray

Diagnosis. Adults of *Monosoma* are distinguished from those of other North American genera of the tribe by the concolorous abdominal terga, by the long medial length of the metathoracic postnotum, and by the long flagellomere 1 (1.5 times longer than 4).

Diversity. The genus consists of two species, one in temperate regions of Europe and the other, *M. inferentia* (Norton), in eastern North America and Canada (Smith 1979*b*).

Host. Larvae feed on alders (Smith 1979*b*).

Comments. Smith (1979*b*) characterized the single North American species of the genus.

Genus *Monostegia* Costa

Diagnosis. Adults of *Monostegia* are distinguished from other North American genera of the tribe by the concolorous abdominal terga, by the short medial length of the metathoracic postnotum, and by the many setae on the mesoscutellar appendage.

Diversity. The genus consists of four species found across Eurasia (Taeger 1987). In eastern United States and in Canada only *M. abdominalis* (Fabricius), an introduced species, is known (Smith 1979*b*).

Host. Larvae feed on *Lysimachia* and *Anagallis* (Smith 1979*b*).

Comments. Smith (1979*b*) characterized the single species of the genus. Price (1970) described the biology of *M. abdominalis*.

Genus *Ametastegia* Costa

Diagnosis. Adults of *Ametastegia* are distinguished from those of other North American genera of the tribe by the absence of pale spots on basal abdominal terga, by the well-developed occipital ridge along the posterior margin of the head in lateral view, and by the almost straight anterior margin of the clypeus.

Diversity. The genus consists of about 28 species found in Eurasia and North America (Smith 1979*b*). In North America 15 species are known. In Canada 10 species are recorded, but 13 are expected. The range of the genus extends throughout temperate and boreal regions (Smith 1979*b*).

Host. Larvae feed on *Rumex*, *Polygonum*, violet, and willow (Smith 1979*b*).

Comments. Smith (1979*b*) revised the North American species of the genus.

Genus *Aphilodyctium* Ashmead

Diagnosis. Adults of *Aphilodyctium* are distinguished from those of other North American genera of the tribe by the absence of pale paired spots on the basal abdominal terga, by the well-developed occipital ridge along the posterior margin of the head in lateral view, and by the deeply concave anterior margin of the clypeus.

Diversity. The genus consists of a single North American species, *A. fidum* (Cresson), found across the temperate and southern boreal regions of North America (Smith 1979*b*).

Host. Larvae feed on roses (Smith 1979*b*).

Comments. Smith (1979*b*) characterized the single species of the genus.

Tribe Allantini

Diagnosis. Adults of Allantini are distinguished from those of other tribes of the subfamily by the very long medial length of the metathoracic postnotum.

Diversity. The range of the tribe extends throughout Eurasia and North America (Smith 1979*b*). In North America, including Canada, three genera are known (Smith 1979*b*).

Genus *Allantus* Panzer

Diagnosis. Adults of *Allantus* are distinguished from those of other North American genera of the tribe by the presence of setae on the mesoscutellar appendage and by the concolorous antennae.

Diversity. The genus consists of about 35 species found across Eurasia and North America (Smith 1979*b*). In North America eight species are known (Smith 1979*b*). In Canada six species are recorded, but seven are expected.

Host. Larvae feed on rose, strawberry, birch, and *Rubus* (Smith 1979*b*).

Comments. Smith (1979*b*) revised the North American species of the genus.

Genus *Macremphytus* MacGillivray

Diagnosis. Adults of *Macremphytus* are distinguished from those of other North American genera of the subfamily by the bicolorous or tricolorous antennae and by the very long medial portion of the metathoracic postnotum.

Diversity. The genus consists of four North American species found throughout the temperate regions of North America (Smith 1979*b*).

Host. Larvae feed on dogwood (Smith 1979*b*).

Comments. Smith (1979*b*) revised the species of the genus.

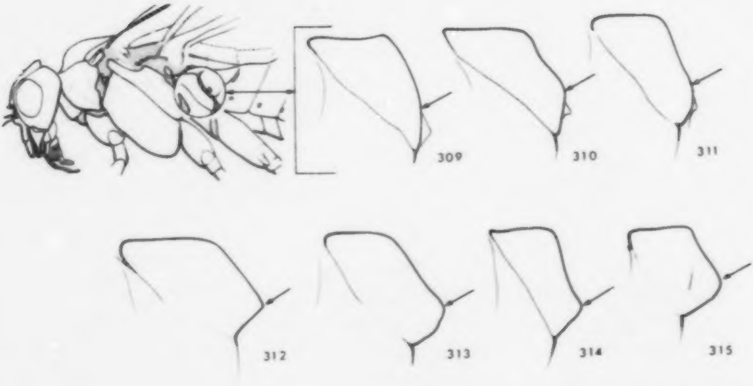
Genus *Taxonus* Hartig

Diagnosis. Adults of *Taxonus* are distinguished from those of other North American genera of the tribe by the absence of setae on the mesoscutellar appendage.

Diversity. The genus consists of about 30 species found in Eurasia and North America (Smith 1979*b*). The genus is most diverse in eastern Asia (Benson 1952). In North America nine species are recorded (Smith 1979*b*). In Canada eight species are known, but nine are expected. The genus is most diverse in eastern North America (Smith 1979*b*).

Host. Larvae feed on strawberry and *Rubus* (Smith 1979*b*).

Comments. Smith (1979*b*) revised the North American species of the genus.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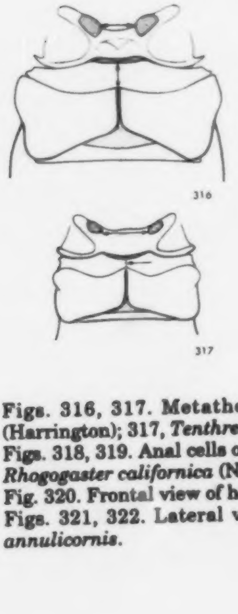
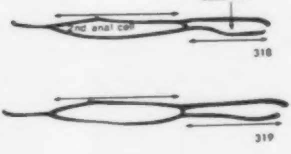
Figs. 309–315. Metepimeron. 309, *Tenthredo originalis* (Norton); 310, *Tenthredo basilaris* Say; 311, *Rhogogaster californica* (Norton); 312, *Lagium atroviolaceum* (Norton); 313, *Aglaostigma quattuordecimpunctatum* (Norton); 314, *Zaschizonyx montana* (Cresson); 315, *Filacus pluricincta* (Norton).




basal cell
2nd anal cell
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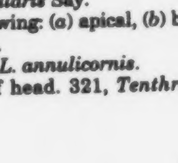
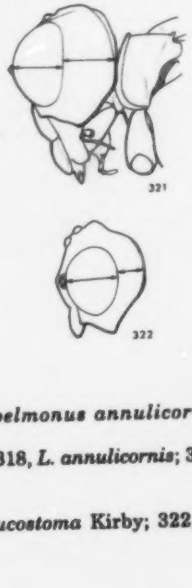




Figs. 316, 317. Metathoracic postnotum. 316, *Leucopelmonus annulicornis* (Harrington); 317, *Tenthredo basilaris* Say.
Figs. 318, 319. Anal cells of fore wing: (*a*) apical, (*b*) basal. 318, *L. annulicornis*; 319, *Rhogogaster californica* (Norton).
Fig. 320. Frontal view of head of *L. annulicornis*.
Figs. 321, 322. Lateral view of head. 321, *Tenthredo leucostoma* Kirby; 322, *L. annulicornis*.

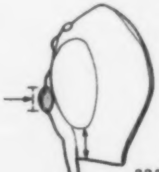
Key to tribes and genera of Tenthredininae

1 **Angle of posteroventral margin of metepimeron almost lacking or obtuse (Figs. 309–311) 2**

Angle of posteroventral margin of metepimeron almost square (Figs. 312–315) 5

2(1) **Medial length of postnotum of metathorax half of distance (or more) between cenchri (Fig. 316). Length of basal anal cell of fore wing 0.5–0.6 that of apical anal cell (Fig. 318). Maximum postocular width in lateral view 0.5–0.6 that of eye (Fig. 322). Inner margin of eye in anterior view straight to slightly convex (Fig. 320) .... Perineurini: *Leucopelmonus* MacGillivray (p. 186)**

Medial length of postnotum of metathorax about one-third of distance between cenchri (Fig. 317). Length of basal anal cell of fore wing 0.7–1.0 that of apical anal cell (Fig. 319). Maximal postocular width in lateral view 0.7–1.1 maximum width of eye (Fig. 321). Inner margin of eye in anterior view slightly to markedly concave (Figs. 326, 327) .... Tenthredinini 3



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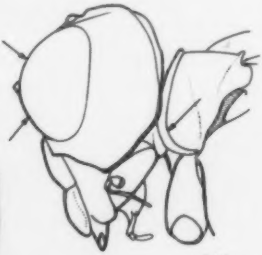

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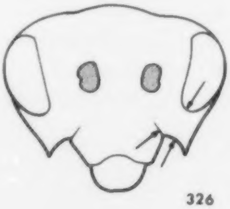

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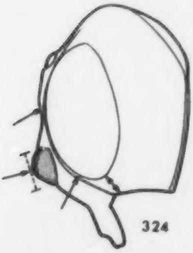

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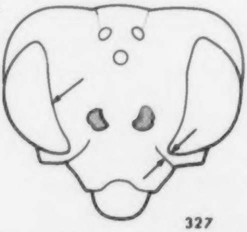

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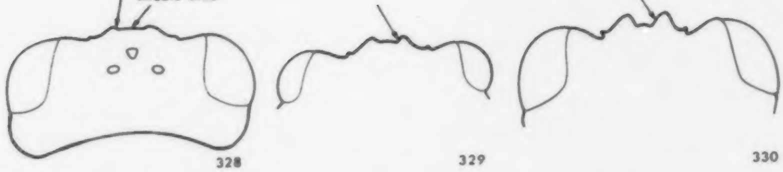
Figs. 323–325. Lateral view of head. 323, *Ischyroceraea arctica* (Thomson); 324, *Rhogogaster californica* (Norton); 325, *Tenthredo leucostoma* Kirby.
Figs. 326, 327. Frontal view of head. 326, *I. arctica*; 327, *T. leucostoma*.



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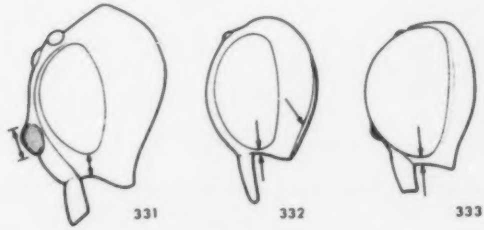

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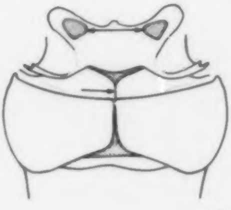

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Figs. 328–330. Dorsal view of head. 328, *Macrophya bifasciata* (Say); 329, *Ischyroceraea arctica* (Thomson); 330, *Tenthredo leucostoma* Kirby.
Figs. 331–333. Lateral view of head. 331, *Aglaostigma semiluteum* (Norton); 332, *Filacus pluricincta* (Norton); 333, *M. trisyllaba* (Norton).
Fig. 334. Metathoracic postnotum of *Lagium atroviolaceum* (Norton).

3(2) Minimum malar length 1.2 times or more that of antennal socket (Fig. 323) .... ***Ischyroceraea* Kiaer** (p. 189)

Minimum malar length 0.8 times or less that of antennal socket (Fig. 324) 4

4(3) Eye small: in lateral view, surface adjacent to inner margin of eye visible in front of at least ventral half of eye (Fig. 324). Main axis of eye extending to frontal condyle of mandible (Fig. 326). Apical margin of labrum straight or slightly concave. In lateral view, pronotum without groove near ventral and anterior margins .... ***Rhogogaster* Konow** (p. 188)

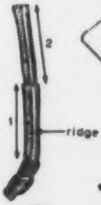
Eye large: in lateral view, surface adjacent to inner margin of eye not visible in front of eye (Fig. 325). Main axis of eye extending to frontoclypeal suture (Fig. 327). Apical margin of labrum convex (Fig. 327). In lateral view, pronotum with groove near anterior margin and usually near ventral margin (Fig. 325) .... ***Tenthredo* Linnaeus** (p. 189)

5(1) In dorsal view, inner ridge of antennal socket clearly projected beyond median area (Fig. 330). In lateral view, head without occipital ridge (Fig. 331). Minimum malar space 0.6–0.9 of diameter of antennal socket (Fig. 331). (Clypeus straight) ....Tenthredopsini: ***Aglaostigma* Kirby** (p. 187)

In dorsal view, inner ridge of antennal socket slightly (or not) projected beyond median area (Figs. 328–329). In lateral view, head with clearly defined occipital ridge extended from the mandible to the postocellar furrow (Fig. 332). Minimum malar space 0.2–0.5 of diameter of antennal socket (Figs. 332–333) 6

6(5) Main axis of eye extending between mandibular condyles (Fig. 331). Medial length of postnotum of metathorax about half of distance between cenchri (Fig. 334). Ventroposterior margin of metepimeron forming a sharp angle (Fig. 312). Mesoscutellar appendage smooth and not pitted. Length of basal anal cell of fore wing about half as long as that of apical anal cell (Fig. 318) .... Tenthredinini: ***Lagium* Konow** (p. 188)

Main axis of eye extending towards frontal condyle (Fig. 333). Medial length of postnotum of metathorax 0.2–0.3 of distance between cenchri. Ventroposterior margin of metepimeron round or slightly extended and not sharp (Fig. 313, 315). Mesoscutellar appendage sculptured or with few to many pits (or both). Length of basal anal cell of fore wing about three-quarters as long as or longer than that of apical anal cell (Fig. 319) 7



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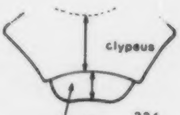

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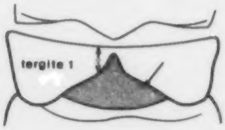

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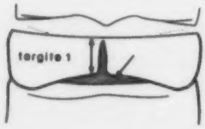

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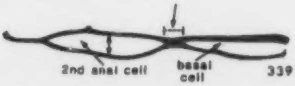

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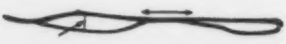

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Fig. 335. Antenna; flagellomeres 1 and 2 of male of *Pachyprotasis rapae* (Linnaeus).
Fig. 336. Clypeus and labrum of *Filacus pluricincta* (Norton).
Figs. 337, 338. Tergum 1 (membranous area stippled). 337, *Zaschizonyx montana* (Cresson); 338, *F. pluricincta*.
Figs. 339, 340. Anal cells of fore wing. 339, *Z. montana*; 340, *P. rapae*.

7(6) Medial length of labrum shorter than that of clypeus (Fig. 336). Longest spur at apex of metatibia subequal to maximum width of tibia .... Sciapterygini 8

Medial length of labrum as long as or longer than that of clypeus. Longest spur at apex of metatibia markedly longer than maximum width of tibia ..... Macrophyini 9

8(7) Apical margin of clypeus widely and deeply concave. Minimum malar space about half of diameter of antennal socket. Membranous area between terga 1 and 2 large: tergum 1 short near middle (Fig. 337) .... ***Zaschizonyx* Ashmead** (p. 186)

Apical margin of clypeus straight or slightly concave (Fig. 336). Minimum malar space about 0.2 of diameter of antennal socket. Membranous area between terga 1 and 2 small: tergum 1 long near middle (Fig. 338) .... ***Filacus* Smith & Gibson** (p. 187)

9(7) Flagellomere 1 about as long as 2 (Fig. 335). Eye small: in lateral view, surface adjacent to inner margin of eye visible (as in Fig. 324). Basal and apical anal cells of fore wing fused for a distance longer than width of anal cells (Fig. 340). Flagellomeres 1–7 in male with sharp lengthwise ridge (Fig. 335) .... ***Pachyprotasis* Hartig** (p. 190)

Flagellomere 1 at least 1.5 times longer than 2. Eye large: in lateral view, surface adjacent to inner margin of eye not visible in front of eye (as in Fig. 325). Basal and apical anal cells of fore wing fused for a distance as long as (longer in a few aberrant specimens) or less than width of anal cells (Fig. 339). Flagellomeres 1–7 in male without lengthwise ridge .... ***Macrophya* Dahlbom** (p. 190)

Clé des tribus et des genres de Tenthredininae

1 Angle postéroventral du métépimère presque absent ou obtus (fig. 309 à 311) 2

Angle postéroventral du métépimère presque droit (fig. 312 à 315) 5

2(1) Longueur médiane du postnotum du métathorax égale (ou supérieure) à la moitié de la distance entre les cenchri (fig. 316). Longueur de la cellule anale basale de l'aile antérieure 0,5 à 0,6 fois celle de la cellule anale apicale (fig. 318). Largeur postocellaire maximale de 0,5 à 0,6 fois celle de l'oeil en vue latérale (fig. 322). Bord interne de l'oeil, en vue antérieure, variant de rectiligne à légèrement convexe (fig. 320) .... Perineuri : ***Leucopelmonus*** **MacGillivray** (p. 186)

Longueur médiane du postnotum du métathorax approximativement égale au tiers de la distance entre les cenchri (fig. 317). Longueur de la cellule anale basale de l'aile antérieure de 0,7 à 1,0 fois celle de la cellule anale apicale (fig. 319). Largeur postoculaire maximale de 0,7 à 1,1 la largeur maximale de l'oeil en vue latérale (fig. 321). Bord interne de l'oeil, en vue antérieure, variant de légèrement à fortement concave (fig. 326, 327) .... Tenthredinini 3

3(2) Longueur malaire minimale égale ou supérieure à 1,2 fois celle de la cavité antennaire (fig. 323) .... ***Ischyroceraea*** **Kiaer** (p. 189)

Longueur malaire minimale égale ou inférieure à 0,8 fois celle de la cavité antennaire (fig. 324) 4

4(3) Oeil petit : en vue latérale, surface adjacente au bord interne de l'oeil visible au moins devant la moitié ventrale de l'oeil (fig. 324). Axe principal se prolongeant jusqu'au condyle frontal de la mandibule (fig. 326). Bord apical du labre rectiligne ou légèrement concave. En vue latérale, absence de sillon sur le pronotum près des bords ventral et antérieur .... ***Rhogogaster*** **Konow** (p. 188)

Oeil grand : en vue latérale, surface adjacente au bord interne de l'oeil non visible devant l'oeil (fig. 325). Axe principal de l'oeil se prolongeant jusqu'à la suture frontoclypéale (fig. 327). Bord apical du labre convexe (fig. 327). En vue latérale, pronotum pourvu d'un sillon près du bord antérieur et généralement près du bord ventral (fig. 325) .... ***Tenthredo*** **Linnaeus** (p. 189)

5(1) En vue dorsale, carène interne de la cavité antennaire nettement en saillie au-dessus de la région médiane (fig. 330). En vue latérale, tête sans carène occipitale (fig. 331). Surface malaire minimale de 0,6 à 0,9 fois le diamètre de la cavité antennaire (fig. 331). (Clypéus rectiligne) .... Tenthredopsini : ***Aglaostigma*** **Kirby** (p. 187)

En vue dorsale, carène interne de la cavité antennaire légèrement en saillie (ou pas en saillie) au-dessus de la région médiane (fig. 328, 329). En vue latérale, tête pourvue d'une carène occipitale nettement définie s'étendant de la mandibule au sillon postocellaire (fig. 332). Surface malaire minimale de 0,2 à 0,5 fois le diamètre de la cavité antennaire (fig. 332, 333) 6

6(5) Axe principal de l'oeil s'étendant entre les condyles de la mandibule (fig. 331). Longueur médiane du postnotum du métathorax environ la moitié de la distance entre les cenchri (fig. 334). Bord ventropostérieur du métépimère formant un angle aigu (fig. 312). Appendice mésoscutellaire lisse et non ponctué. Longueur de la cellule anale basale de l'aile antérieure approximativement la moitié de celle de la cellule anale apicale (fig. 318) .... Tenthredinini : ***Lagium* Konow** (p. 188)

Axe principal de l'oeil s'étendant vers le condyle frontal (fig. 333). Longueur médiane du postnotum du métathorax de 0,2 à 0,3 fois la distance entre les cenchri. Bord ventropostérieur du métépimère arrondi ou se prolongeant légèrement et ne formant pas d'angle aigu (fig. 313, 315). Appendice mésoscutellaire sculpté ou pourvu de fosses variant de quelques-unes à beaucoup (ou les deux). Longueur de la cellule anale basale de l'aile antérieure environ les trois quarts de celle de la cellule anale apicale (fig. 319) 7

7(6) Longueur médiane du labre inférieure à celle du clypéus (fig. 336). Éperon le plus long à l'apex du métatibia presque égal à la longueur maximale du tibia .... Sciapterygini 8

Longueur médiane du labre égale ou supérieure à celle du clypéus. Éperon le plus long à l'apex du métatibia nettement plus long que la largeur maximale du tibia .... Macrophyini 9

8(7) Bord apical du clypéus largement et profondément concave. Surface malaire minimale environ la moitié du diamètre de la cavité antennaire. Surface membraneuse entre les terga 1 et 2 grande : tergum 1 court près du centre (fig.337) .... ***Zaschizonyx* Ashmead** (p. 186)

Bord apical du clypéus rectiligne ou légèrement concave (fig. 336). Surface malaire minimale environ 0,2 fois le diamètre de la cavité antennaire. Surface membraneuse entre les terga 1 et 2 petite : tergum 1 long près du milieu (fig. 338) .... ***Filacus* Smith & Gibson** (p. 187)

9(7) Article 1 du flagelle presque aussi long que l'article 2 (fig. 335). Oeil petit : en vue latérale, surface adjacente au bord interne de l'oeil visible (comme sur la fig. 324). Cellules anales apicale et basale de l'aile antérieure fusionnées sur une distance supérieure à la largeur des cellules anales (fig. 340). Articles 1 à 7 du flagelle pourvus d'une carène longitudinale tranchante chez le mâle (fig. 335) .... ***Pachyprotasis* Hartig** (p. 190)

Article 1 du flagelle au moins 1,5 fois plus long que l'article 2. Oeil large : en vue latérale, surface adjacente au bord interne de l'oeil non visible devant l'oeil (comme sur la fig. 325). Cellules anales apicale et basale de l'aile antérieure fusionnées sur une distance égale (supérieure chez certains spécimens aberrants) ou inférieure à la largeur des cellules anales (fig. 339). Articles 1 à 7 du flagelle du mâle sans carène longitudinale .... ***Macrophya* Dahlbom** (p. 190)

Subfamily Tenthredininae

Diagnosis. Adults of the subfamily are distinguished from those of other subfamilies of Tenthredinidae by the fore wing deviation of the vein R between junctions of M and Sc and by the long distance of R between the junctions of M and Rs+M.

Diversity. The subfamily consists of over 1000 species and 44 genera (M. Abe and D.R. Smith, personal communication). The range of the subfamily extends throughout temperate, boreal, and arctic regions of the northern hemisphere (Benson 1952). In North America five tribes, 11 genera, and about 150 species are known (Ross 1937; Smith 1979*a*). In Canada five tribes, nine genera, and over 90 species are recorded, but 10 genera and over 120 species are expected.

Host. Larvae are external feeders on leaves of numerous families of flowering plants, conifers, and even ferns (Benson 1952).

Tribe Perineurini

Diversity. Perineurini is a small tribe consisting of two genera and three species (Benson 1952). The tribe's range extends throughout temperate regions of Eurasia and North America (Benson 1952). In North America, including Canada, only one genus is known (Smith 1979*a*).

Genus *Leucopelmonus* MacGillivray

Diagnosis. Adults of *Leucopelmonus* are distinguished from those of other North American genera of the subfamily by the medially long postnotum of the metathorax and by the slightly or not angular dorsal margin of the metepimeron in the posterior third.

Diversity. The genus consists of a single eastern North American species, *L. annulicornis* (Harrington) (Smith 1979*a*). However, I have seen an additional species from Japan.

Comments. Ross (1937) characterized the genus and its single species.

Tribe Sciapterygini

Diversity. Sciapterygini consists of five genera (Smith and Gibson 1984) and about 40 species (Benson 1959). The tribe's range extends throughout temperate regions of Eurasia and North America (Benson 1959). In North America two genera and five species are recorded (Smith and Gibson 1984). In Canada two genera and two species are known.

Genus *Zaschizonyx* Ashmead

Diagnosis. Adults of *Zaschizonyx* are distinguished from those of other North American genera of the subfamily by the angular ventroposterior margin of the metepimeron, by the short labrum (length shorter at middle than that of the clypeus), and by the widely emarginate clypeus medially.

Diversity. The genus consists of only one species, *Z. montana* (Cresson), widespread throughout North America (Smith and Gibson 1984).

Host. Larvae of *Z. montana* feed on leaves of *Symphoricarpos* (Smith 1979*a*).

Comments. Smith and Gibson (1984) characterized the genus and its single species.

Genus *Filacus* Smith and Gibson

Diagnosis. Adults of *Filacus* are characterized as for *Zaschizonyx*, but the clypeus is straight anteriorly.

Diversity. The genus consists of four western North American species (Smith and Gibson 1984). Two specimens of *F. doanei* (Rohwer) are recorded in western Canada. Smith and Gibson (1984) assume that these specimens are mislabeled. *Filacus doanei* is otherwise recorded as far north as San Francisco, Calif.

Host. Larvae of the genus have been reported in *Amsinckia* and *Phacelia* (Smith and Gibson 1984).

Comments. Smith and Gibson (1984) revised the species of the genus.

Tribe Tenthredopsini

Diversity. Tenthredopsini consists of three genera and about 50 species from temperate and boreal regions of Eurasia and North America (Benson 1952). In North America, including Canada, one genus is known (Smith 1979*a*).

Genus *Aglaostigma* Kirby

Diagnosis. Adults of *Aglaostigma* are distinguished from those of other North American genera of the subfamily by the clearly angular ventroposterior margin of the metepimeron and by the absence of an occipital ridge on the head in lateral view.

Diversity. The genus is known in Eurasia and North America (Benson 1952; Smith 1979*a*). In North America seven species are known (Smith 1979*a*). In Canada four species are recorded, but five are expected. The range of the genus in North America extends throughout temperate and southern fringes of boreal regions (Smith 1979*a*).

Host. Larvae feed on *Galium* (Benson 1952), *Podophylum*, and *Impatiens* (Smith 1979*a*).

Comments. Ross (1943*a*) revised the North American species of the genus.

Tribe Tenthredinini

Diversity. In North America, including Canada, four genera of Tenthredinini are known (Smith 1979*a*). The tribe's range extends throughout temperate, boreal, and southern arctic regions of North America and Eurasia (Benson 1952).

Genus *Lagium* Konow

Diagnosis. Adults of *Lagium* are distinguished from those of other North American genera of the subfamily by the postnotum of the metathorax, which is long medially, and by the sharply extended ventroposterior margin of the metepimeron.

Diversity. The genus consists of one North American species, *L. atroviolaceum* (Norton) (Smith 1986*a*). It is recorded in southeastern Canada.

Host. Larvae feed on *Sambucus* (elderberry) and *Viburnum* bushes (Smith 1979*a*, 1986*b*).

Comments. Smith (1986*b*) characterized the genus and its single species.

Genus *Rhogogaster* Konow

Diagnosis. Adults of *Rhogogaster* are distinguished from those of other North American genera of the subfamily by the ventroposterior margin of the metepimeron, which is only obtusely angular; by the lowest angle of the eye in frontal view, which is nearest to the frontal condyle; and by the clearly outlined surface of the head capsule above part of the inner margin of the eye in lateral view.

Diversity. The genus consists of 24 species found throughout temperate and boreal regions of Eurasia and North America (Benson 1965). In North America, including Canada, four species are known (Smith 1979*a*).

Host. The larvae of two of the North American species feed on a wide variety of plants: poplar, alder, buttercup, *Filipendula*, *Stellaria*, and *Circaea*.

Comments. Benson (1965) revised the species of the genus. Ross (1943*c*) revised the North American species.

Genus *Ischyroceraea* Kiaer

Diagnosis. Adults of *Ischyroceraea* are distinguished from those of other North American genera of the subfamily by the minimum malar space, which is 1.2 times longer than the diameter of the antennal socket.

Diversity. The genus consists of one species, *I. arctica* (Thomson), found in arctic and subarctic regions of Eurasia and Alaska (Smith 1974*b*). This species is expected in the Yukon Territory.

Comments. Smith (1974*b*) characterized the single species of the genus.

Genus *Tenthredo* Linnaeus

Diagnosis. Adults of *Tenthredo* are distinguished from those of other North American genera of the subfamily by characters discussed under *Rhogogaster*, but the head capsule is not visible above the inner margin of the eye in lateral view, and the lowest angle of the eye in frontal view is nearest to the clypeus.

Diversity. The genus consists of over 700 species (Smith 1979*a*). The range of the genus extends throughout temperate, boreal, and southern arctic regions of Eurasia and North America (Benson 1952; Smith 1979*a*). In North America over 80 species are known (Smith 1979*a*). In Canada 40 species are recorded, but over 75 are expected.

Host. Adults often feed on insects in flowers that are not necessarily associated with larval food plants. Larvae feed on a very wide variety of plants, though larvae of each species are often restricted to one plant host. Larvae have been recorded in Europe from the following plant genera: bracken fern, *Athyrium*, *Petasites*, *Tussilago*, *Brassica*, *Lamium*, mint, fireweed, honeysuckle, hazelnut, rose, willow, mountain ash, *Viburnum*, *Filipendula*, cherry and plum, alder, *Hypericum*, *Circaea*, *Heracleum*, *Scrophilaria*, *Verbascum*, ash, *Jasminium*, *Ligustrum*, *Symphoricarpos*, lilac, *Oreganum*, and clover (Benson 1952).

Comments. In North America the genus is in need of study. Smulyan (1923) studied the species of New England. Strickland (1954) studied females of the Canadian prairies.

Tribe Macrophyini

Diversity. Macrophyini consists of three genera and probably over 300 species from temperate and boreal regions of Eurasia and North America (Benson 1952; Gibson 1980*a*, 1980*b*). In North America three genera and 50 species are recorded (Gibson 1980*a*, 1980*b*). In Canada two genera and 36 species are known, but 46 are expected.

Genus *Macrophya* Dahlbom

Diagnosis. Adults of *Macrophya* are distinguished from those of other North American genera of the subfamily by the expanded metepimeron dorsally, by the long labrum (longer medially than the medial length of the clypeus), and almost always by the narrowly joined anal cells of the fore wing near the middle.

Diversity. The genus consists of over 200 species (Benson 1952; Gibson 1980*a*). In North America 46 species are known (Gibson 1980*a*). In Canada 35 species are recorded, but 45 are expected.

Host. Larvae may feed on a wide variety of plants or on one species only. Larvae have been recorded in Europe from the following plant genera: elderberry, mint, *Geum*, *Plantago*, *Filipendula*, ash, *Scropularia*, goldenrod, *Senecio*, *Solanum*, *Ligustrum*, *Rubus*, *Geranium*, hickory, *Valeriana*, sedge, many genera of grasses, *Potentilla*, aster, cherry and plum, *Viburnum*, buckeye, and lilac (Benson 1952).

Comments. Gibson (1980*a*) revised the North American species of the genus.

Genus *Pachyprotasis* Hartig

Diagnosis. Adults of *Pachyprotasis* are distinguished from those of other North American genera of the subfamily by characters discussed under *Macrophya*, except that the anal cells of the fore wing are fused for a distance longer than the width of the anal cells, and the surface of the head capsule nearest to the eye is visible above the inner margin of the eye in lateral view.

Diversity. The genus consists of probably 90 or more species from temperate and boreal regions of Eurasia and North America (Benson 1952). In North America, including Canada, only one species is known, *P. rapae* (Linnaeus) (Smith 1979*a*).

Host. Larvae feed on goldenrod, *Scrophularia*, *Betonica*, ash, and *Anthirrhinum* (Benson 1952; Smith 1979*a*).

Comments. Benson (1952) characterized the single North American species of the genus.

Superfamily Cephoidea

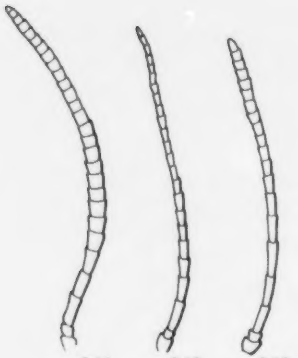
Diagnosis. Adults of Cephoidea are distinguished from those of other Symphyta by the absence of cenchri on the metanotum and by the slight dorsoventral constriction between abdominal segments 1 and 2.

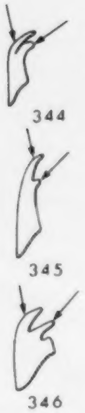
Diversity. This superfamily includes only the family Cephidae.

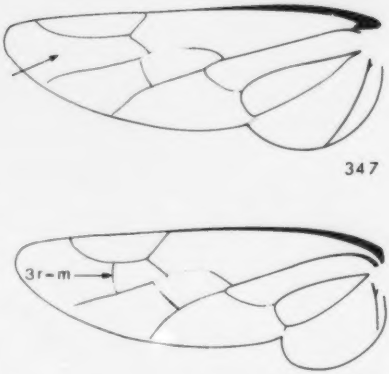
FAMILY CEPHIDAE

Diagnosis. See Cephoidea.

Diversity. Cephidae consists of two subfamilies, three tribes, 13 genera, and about 100 species (Benson 1946). It is recorded in Europe, Asia, North America, and Madagascar (Benson 1946). I have also seen two specimens from Australia. The family is most diverse in temperate regions of Eurasia. In North America six genera belonging to Cephinae are known (Ries 1937; Ross 1937; Smith 1979*a*). In Canada five genera are recorded, but six are expected. In North America the family is most diverse in temperate regions east of the Great Lakes and west of the Rocky Mountains (Smith 1979*a*).







Figs. 341–343. Antenna. 341, *Hartigia trimaculata* (Say); 342, *Janus abbreviatus* (Say); 343, *Cephus cinctus* Norton.
Figs. 344–346. Tarsal claw. 344, *H. trimaculata*; 345, *C. cinctus*; 346, *J. abbreviatus*.
Figs. 347, 348. Hind wing. 347, *Coenocephus aldrichi* Bradley; 348, *J. abbreviatus*.

Subfamily Cephinae

Diagnosis. Adults of Cephinae are distinguished from those of the other subfamilies by the presence of 4 labial palpomeres and 6 maxillary palpomeres.

Diversity. This subfamily consists of three tribes, 12 genera, and 97 species (Benson 1946). The area of greatest diversity is in temperate Eurasia (Benson 1946). In North America, including Canada, two tribes and six genera are known (Smith 1979*a*).

Key to tribes and genera of Cephidae

(modified from Benson 1946)

1 Flagellum thread-like (viewed from widest flagellar side) or slightly swollen from flagellomere 1 (Figs. 341, 342). Tarsal claw curved sharply at apex; preapical tooth subequal to and stouter than apical one (Figs. 344, 346). Length of metatarsomere 1 as long as or longer than that of combined tarsomeres 2–4 .... Hartigiini 2

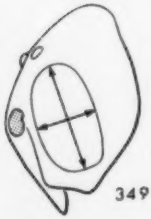
Flagellum slightly swollen from flagellomere 3 (Fig. 343). Tarsal claw slightly curved at apex; preapical tooth shorter and thinner than apical one (Fig. 345). Length of metatarsomere 1 clearly shorter than that of combined tarsomeres 2–4 .... Cephini 4

2(1) Metatibia without preapical spurs. Cercus in female longer than 0.7 of length of dorsal margin of valvula 3 in lateral view. Vein 3r-m of hind wing absent (Fig. 347) .... ***Caenocephus* Konow** (p. 198)

Metatibia with 1 or 2 preapical spurs. Cercus in female shorter than half the length of dorsal margin of valvula 3 in lateral view. Vein 3r-m of hind wing developed (Fig. 348) 3

3(2) Maxillary palpomere 6 attached at apex of 5; palpomere 4 about as long as 6 (Fig. 351). Eye 1.5 times higher than its width (Fig. 349). Base of tarsal claw barely enlarged (Fig. 344) .... ***Hartigia* Schiodte** (p. 198)

Maxillary palpomere 6 attached near base of 5; palpomere 4, 1.5 times as long as or longer than 6 (Fig. 352). Eye 1.3 times as high as, or less than, its width (Fig. 350). Base of tarsal claw clearly enlarged (Fig. 346) .... ***Janus* Stephens** (p. 198)



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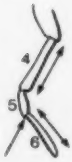

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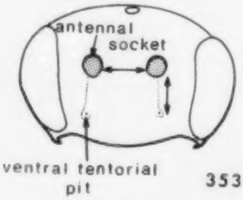

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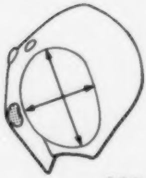

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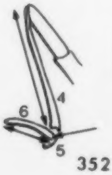

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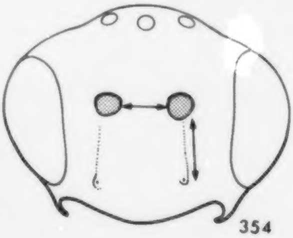

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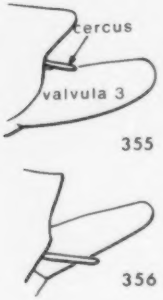
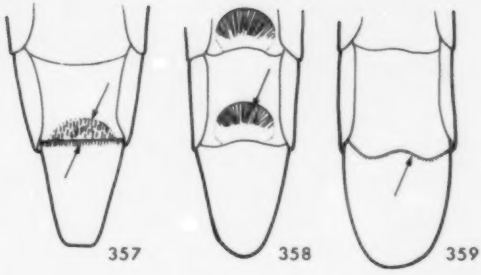
Figs. 349, 350. Lateral view of head. 349, *Hartigia trimaculata* (Say); 350, *Janus abbreviatus* (Say).
Figs. 351, 352. Maxillary palpomeres 3–6. 351, *H. trimaculata*; 352, *J. abbreviatus*.
Figs. 353, 354. Frontal view of head. 353, *Cephus cinctus* Norton; 354, *Calameuta clavata Norton*.





Figs. 355, 356. Cercus and valvula 3. 355, *Cephus cinctus* Norton; 356, *Trachelus tabidus* (Fabricius).
Figs. 357–359. Abdominal sterna 7–9 of male. 357, *C. cinctus*; 358, *T. tabidus*; 359, *Calameuta clavata* (Norton).

4(1) Head in frontal view narrow: distance between inner margins of antennal sockets less than 0.7 times that between ventral margin of antennal socket and centre of ventral tentorial pit on same side (Fig. 354). Length of cercus in female about as long as that of dorsal margin of valvula 3 in lateral view. Sternum 8 in male without medial cavity, with long setae, or without modified setae on apical margin (Fig. 359) ..... ***Calameuta* Konow** (p. 200)

Head in frontal view wide: distance between inner margin of antennal sockets 0.8–1.2 times that between ventral margin of antennal socket and centre of ventral tentorial pit on same side (Fig. 353). Length of cercus in female less than 0.6 that of dorsal margin of valvula 3 in lateral view (Fig. 356). Sternum 8 in male with medial cavity either with long setae (Fig. 358) or with modified setae on apical margin (Fig. 357) 5

5(4) Abdominal terga 4 and 6 with pale transverse band or completely pale. Length of cercus in female about 0.3 that of dorsal margin of valvula 3 in lateral view (Fig. 355). Sternum 8 in male without medial cavity but with modified setae on apical margin (Fig. 357) .... ***Cephus* Latreille** (p. 199)

Abdominal terga 4 and 6 black or with spot laterally. Length of cercus in female about half that of dorsal margin of valvula 3 in lateral view (Fig. 356). Sternum 8 in male with modified setae developed in deep medial cavity (Fig. 358) .... ***Trachelus* Jurine** (p. 200)

Clé des tribus et des genres de Cephidae

(modifiée de Benson1946)

1 Flagelle filiforme (observé du côté le plus large du flagelle) ou légèrement enflé à partir de l'article 1 (fig. 341, 342). Griffe du tarse fortement recourbée à l'apex; dent préapicale presque de la même longueur et plus forte que la dent apicale (fig. 344, 346). Longueur de l'article 1 du métatarse égale ou supérieure à la longueur des articles 2 à 4 combinés .... Hartigiini 2

Flagelle légèrement enflé à partir de l'article 3 (fig. 343). Griffe du tarse légèrement recourbée à l'apex; dent préapicale plus courte et plus mince que la dent apicale (fig. 345). Longueur de l'article 1 du métatarse nettement inférieure à la longueur des articles 2 à 4 combinés .... Cephini 4

2(1) Métatibia dépourvu d'éperons préapicaux. Chez la femelle, cerque plus long que 0,7 fois la longueur du bord dorsal de la valvule 3 en vue latérale. Nervure 3r-m de l'aile postérieure absente (fig. 347) .... ***Caenocephus*** **Konow** (p. 198)

Métatibia pourvu de 1 ou 2 éperons préapicaux. Chez la femelle, cerque plus court que la moitié du bord dorsal de la valvule 3 en vue latérale. Nervure 3r-m de l'aile postérieure présente (fig 348) 3

3(2) Article 6 du palpe maxillaire attaché à l'apex de l'article 5; article 4 presque aussi long que l'article 6 (fig. 351). Oeil 1,5 fois plus haut que large (fig. 349). Base de la griffe du tarse à peine élargie (fig. 344) .... ***Hartigia*** **Schiodte** (p. 198)

Article 6 du palpe maxillaire attaché près de la base de l'article 5; article 4 d'une longueur égale ou supérieure à 1,5 fois celle de l'article 6 (fig. 352). Hauteur de l'oeil égale ou inférieure à 1,3 fois sa largeur (fig. 350). Base de la griffe du tarse nettement élargie (fig. 346) .... ***Janus*** **Stephens** (p. 198)

4(1) Tête étroite en vue frontale : distance entre les bords internes des cavités antennaires inférieure à 0,7 fois la distance entre le bord ventral de la cavité antennaire et le centre de la fosse tentoriale ventrale du même côté (fig. 354). Chez la femelle, longueur du cerque presque égale à celle du bord dorsal de la valvule 3 en vue latérale. Sternum 8 du mâle sans cavité médiane, garni de longues soies, ou sans soies modifiées sur le bord apical (fig. 359) .... ***Calameuta*** **Konow** (p. 200)

Tête large en vue frontale : distance entre le bord interne des cavités antennaires de 0,8 à 1,2 fois la distance entre le bord ventral de la cavité antennaire et le centre de la fosse tentoriale du même côté (fig. 353). Chez la femelle, longueur du cerque inférieure à 0,6 fois celle du bord dorsal de la valvule 3 en vue latérale (fig. 356). Sternum 8 du mâle avec une cavité médiane munie de longues soies (fig. 358) ou de soies modifiées sur le bord apical (fig. 357) 5

5(4) Terga abdominaux 4 et 6 pourvus d'une bande transversale de couleur pâle, ou complètement de couleur pâle. Chez la femelle, longueur du cerque presque 0,3 fois celle du bord dorsal de la valvule 3 en vue latérale (fig. 355). Sternum 8 du mâle sans cavité médiane mais pourvu de soies modifiées sur le bord apical (fig. 357) .... ***Cephus*** **Latreille** (p. 199)

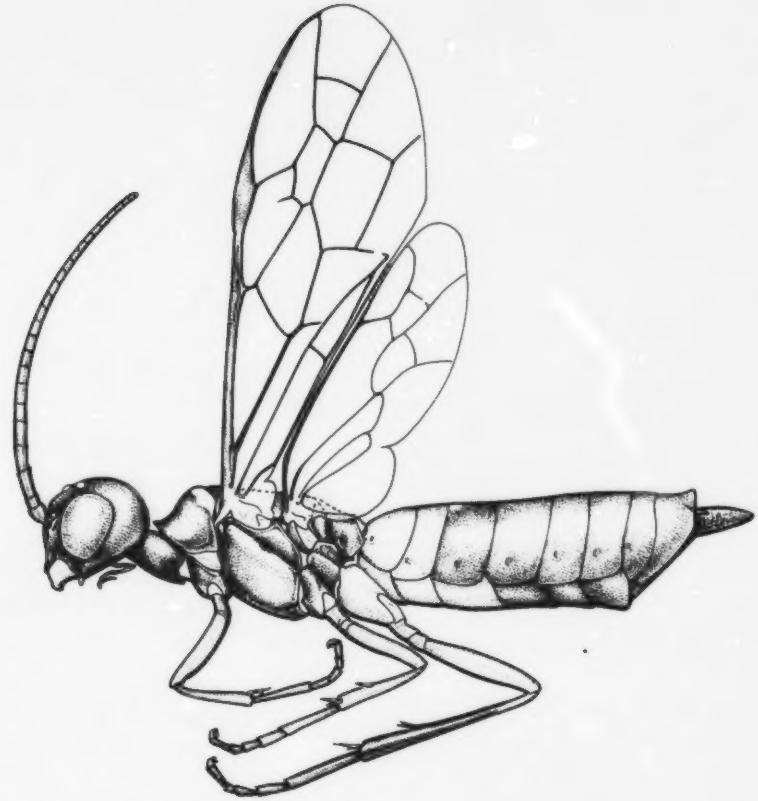
Terga abdominaux 4 et 6 noirs ou garnis de taches sur le côté. Chez la femelle, longueur du cerque égale à environ la moitié du bord dorsal de la valvule 3 en vue latérale (fig. 356). Sternum 8 du mâle pourvu de soies modifiées visibles dans une cavité médiane profonde (fig 358) .... ***Trachelus*** **Jurine** (p. 200)

Tribe Hartigiini

Diagnosis. Adults of Hartigiini are distinguished from Cephini by the thread-like flagellum.

Diversity. Three of the nine genera of the tribe are recorded in North America, including Canada (Benson 1946; Ries 1937; Smith 1979*a*). Most genera are Eurasian (Benson 1946).

Host. Larvae are in stems of woody plants (Benson 1946).



Cephidae: *Janus*

Genus *Caenocephus* Konow

Diagnosis. Adults of *Caenocephus* are distinguished from those of other North American genera of the tribe by the absence of preapical spurs on the metatibia.

Diversity. The genus consists of one eastern Asiatic and one western North American species, *C. aldrichi* Bradley (Benson 1946). In Canada this species is recorded in southern British Columbia.

Host. Adults are reported from *Conium maculatum* (Middlekauff 1952), but Hanson and Miller (1988) found the larvae girdling stems of *Holodiscus discolor*, a rosaceous plant.

Comments. Ries (1937) revised the single North American species.

Genus *Hartigia* Schiodte

Diagnosis. Adults of *Hartigia* are distinguished from those of other North American genera of the tribe by the presence of 1 or 2 spurs before the apex of the metatibia and by the maxillary palpomere 6 attached at the apex of 5.

Diversity. Six of 16 species are recorded in North America (Benson 1946; Smith 1979*a*, 1986*c*). Four species are recorded in Canada, although a fifth is expected. Most species are Eurasian (Benson 1946).

Host. Larvae found in stems of roses and *Rubus* (Smith 1979*a*).

Comments. Smith (1986*c*) revised the North American species of the genus. Middlekauff (1969) and Champlain (1924) discussed the biology of some species.

Genus *Janus* Stephens

Diagnosis. Adults of *Janus* are distinguished from those of other North American genera of the tribe by the presence of 1 or 2 preapical spurs on the metatibia and by the maxillary palpomere 6 attached at the base of 5.

Diversity. Five of 14 species are known in North America (Benson 1946; Ries 1937; Smith 1979*a*). Of these, four are in temperate regions of eastern Canada (Smith 1979*a*).

Host. Larvae of two of the North American species have been found in stems of poplar, willow, oak, *Viburnum*, and *Ribes* (Smith 1979*a*, Smith and Solomon 1989).

Comments. Ries (1937) revised the North American species of the genus. Middlekauff (1969) keyed out and discussed the biology of the North American species, and Smith and Solomon (1989) added one more species and provided a key to North American species.

Tribe Cephini

Diagnosis. Adults of Cephini are distinguished from those of Hartegiini by the slightly and gradually swollen antenna.

Diversity. The tribe consists of three genera, all of which are found in Canada (Benson 1946; Ries 1937; Smith 1979*a*).

Host. Larvae feeds in the stems of many genera of grasses (Smith 1979*a*).

Genus *Cephus* Latreille

Diagnosis. Adults of *Cephus* are distinguished from those of the other genera of the tribe by the wide head and by the presence of a transverse pale band on terga 4–6.

Diversity. The genus consists of about 25 species found mostly in Eurasia (Benson 1946). In North America, including Canada, two species are recorded (Ries 1937; Smith 1979a).

Host. The larvae of each species are polyphagous. They have been reported in many genera of grasses: *Agropyron*, *Bromus*, *Calamagrostis*, *Deschampsia*, *Elymus*, *Festuca*, *Hordeum*, *Phleum*, *Secale*, *Triticum*, and *Avena* (Smith 1979*a*).

Comments. Ries (1937) revised the North American species of the genus. Wallace and McNeil (1966) discussed the life history of North American species. Among the species of the genus, *C. cinctus* (known as the wheat stem sawfly), is one of the most economically important sawflies.

Genus *Calameuta* Konow

Diagnosis. Adults of *Calameuta* are distinguished from those of other genera of the tribe by the narrow head and, in females, by the relatively long cercus.

Diversity. The genus consists of 21 species, most of which are Eurasian (Benson 1946). In North America a single species, *C. clavata* (Norton), is recorded in western North America as far north as southern British Columbia (Ries 1937; Smith 1979*a*).

Host. The exact host is not known, but Middlekauff (1969) found numerous adults in localities where the grass genera *Bromus* and *Deschampsia* grew abundantly. Adults were commonly seen on the yellow flowers of *Ranunculus* (Middlekauff 1969).

Comments. Ries (1937) keyed this species under *Cephus*.

Genus *Trachelus* Jurine

Diagnosis. Adults of *Trachelus* are distinguished from those of other genera of the tribe by the wide head and by the absence of a transverse pale band on terga 4–6.

Diversity. The genus consists of eight species, all of which are Eurasian (Benson 1946). In North America a single introduced species, *T. tabidus* (Fabricius), is recorded in the eastern United States (Ries 1937; Smith 1979*a*). Adults should be sought in southernmost Ontario.

Host. Larvae are recorded from stems of the following genera of grasses: *Hordeum*, *Secale*, and *Triticum* (Smith 1979*a*).

Comments. Ries (1937) revised the North American species of the genus, and Wallace and McNeil (1966) discussed their life history.

Superfamily Anaxyeloidea

FAMILY ANAXYELIDAE

Diversity. Anaxyelidae consists of three subfamilies, 10 genera, and 22 species (Rasnitsyn 1967; Smith 1978). All but one species in the family are extinct. The single extant species, *Syntexis libocedrii* Rohwer, is restricted to the western North America (Smith 1979*a*).

Comments. This family, previously assigned to Siricoidea, is not assigned to any superfamily because it is part of a lineage that very likely consists of a group related to some of the following superfamilies.

Subfamily Syntexinae

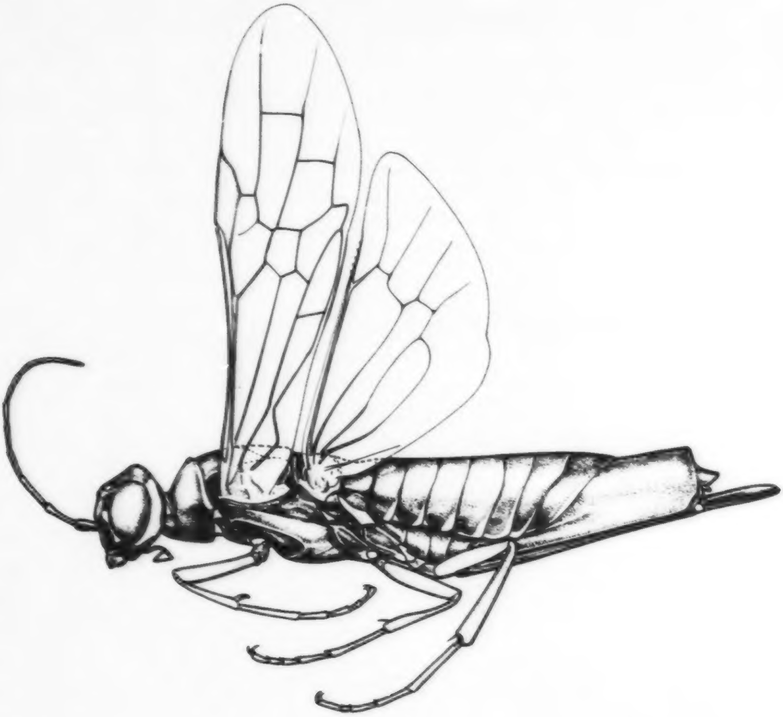
Diversity. Syntexinae consists of one genus, *Syntexis* Rohwer (Rasnitsyn 1967; Smith 1978).

Genus *Syntexis* Rohwer

Diagnosis. Adults of *Syntexis* are distinguished from those of other Symphyta by the pedicel, which is as long as flagellomere 1.

Diversity. The genus consists of only one species, *S. libocedrii* Rohwer (Ross 1937; Rasnitsyn 1967; Smith 1978). This species is recorded in California and Oregon and extends as far north as south-central British Columbia.

Host. Adults oviposit in freshly burned incense-cedar, juniper, and cedar (Westcott 1971; Middlekauff 1974; Smith 1979*a*). Larvae are wood borers.



Anaxyelidae: *Syntexis*

Superfamily Siricoidea

Diagnosis. Adults of Siricoidea are distinguished from those of other superfamilies by the apical tube-like projection on the last tergum in the female or the last sternum in the male and by the collar-shaped pronotum.

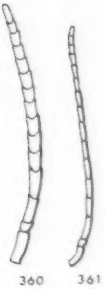
Diversity. The superfamily consists of only one family that occurs naturally in Eurasia, North America, and central Africa and accidentally in Australia, New Zealand, and South America (Benson 1943; Smith 1978).

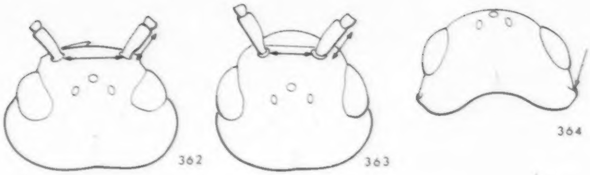
FAMILY SIRICIDAE

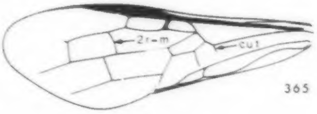
Diversity. Siricidae consists of four subfamilies, 16 genera, and 101 species (Smith 1978, 1988). Only two subfamilies, 10 genera, and 94 species are extant (Benson 1943; Smith 1978, 1988a). In North America siricid wasps are represented by two subfamilies, five genera, and 25 species (Smith 1979*a*). In Canada four genera and 13 species are recorded, but 16 species are expected. Most forested region of Canada have an equally diverse fauna (Smith 1979a).

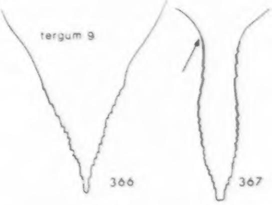
Host. Larvae of all species are wood borers of trees (Smith 1978).

Comments. Smith (1975b) characterized the North American genera. The North American species of the family need study. However, the reader may wish to refer to old or local revisions by Bradley (1913) and Middlekauff (1960). Morris (1967), Stillwell (1966), and Wolf (1968, 1969) discussed the behavior and biology of many siricid wasps.









Figs. 360, 361. Antenna. 360, *Tremex columba* (Linnaeus); 361, *Sirex juvencus* (Linnaeus).
Figs. 362–364. Dorsal view of head. 362, *T. columba*; 363, *S. juvencus*; 364, *Xeris spectrum* (Linnaeus).
Fig. 365. Fore wing of *S. cyaneus* (Fabricius).
Figs. 366, 367. Tergum 9 of female. 366, *S. cyaneus*; 367, *Urocerus gigas flavicornis* (Fabricius).

Key to subfamilies and genera of Siricidae

(modified from Benson 1943)

1 Flagellum thread-like (Fig. 361). Second to last flagellomere about twice as long as wide. Distance between antennal sockets shorter or about as long as length of scape (Fig. 363). Cenchrus twice as wide as long. Vein 2r-m of fore wing developed (Fig. 365) .... Siricinae 2

Flagellum swollen from middle to apex (Fig. 360). Second to last flagellomere about as long as wide. Distance between antennal sockets clearly greater than length of scape (Fig. 362). Cenchrus about as wide as long. Vein 2r-m of fore wing absent .... Tremecinae: ***Tremex* Jurine** (p. 209)

2(1) Head concolor. Horn-like structure of tergum 9 in female triangular and not constricted near base (Fig. 366). Vein Cu_1 of fore wing partly or fully developed (Fig. 365) .... ***Sirex* Linnaeus** (p. 206)

Head with pale spot behind eyes. Horn-like structure of tergum 9 in female long and constricted basally (Fig. 367). Vein Cu_1 of fore wing lacking or reduced to a stump 3

3(2) Posterior margin of postocular area of head in dorsal view with occipital ridge (Fig. 364). Combined length of valvifer 2 and valvula 3 (complete ovipositor sheath) 1.5 times longer than that of fore wing. Metatibia with 1 apical spur .... ***Xeris* Costa** (p. 208)

Posterior margin of postocular area of head in dorsal view without ridge. Combined length of valvifer 2 and valvula 3 (complete ovipositor sheath) as long as or shorter than that of fore wing. Metatibia with 2 apical spurs .... ***Urocerus* Geoffroy** (p. 208)

Clé des sous-familles et des genres de Siricidae

(modifiée de Benson 1943)

1 Flagelle filiforme (fig. 361). Article 2 au dernier article du flagelle environ deux fois plus long que large. Distance entre les cavités antennaires inférieure ou presque égale à la longueur du scape (fig. 363). Cenchrus deux fois plus large que long. Nervure 2r-m de l'aile antérieure présente (fig. 365) .... Siricinae 2

Flagelle enflé à partir du milieu jusqu'à l'apex (fig. 360). Article 2 au dernier article du flagelle presque aussi long que large. Distance entre les cavités antennaires nettement supérieure à la longueur du scape (fig. 362). Cenchrus presque aussi large que long. Nervure 2r-m de l'aile antérieure absente ....
.... Tremecinae: ***Tremex* Jurine** (p. 209)

2(1) Tête de couleur uniforme. Structure en forme de corne du tergum 9 de la femelle triangulaire et non étranglée près de la base (fig. 366). Nervure Cu_1 de l'aile antérieure partiellement ou entièrement visible (fig. 365) .... ***Sirex* Linnaeus** (p. 206)

Tête avec une tache pâle derrière les yeux. Structure en forme de corne du tergum 9 de la femelle long et étranglé près de la base (fig.367). Nervure Cu_1 de l'aile antérieure absente ou sous forme de moignon 3

3(2) Bord postérieur de la région postoculaire de la tête en vue dorsale pourvu d'une carène occipitale (fig. 364). Longueur du valvifère 2 et de la valvule 3 combinés (fourreau complet de l'ovipositeur) 1,5 fois supérieure à celle de l'aile antérieure. Métatibia garni d'un éperon apical .... ***Xeris* Costa** (p. 208)

Bord postérieur de la région postoculaire de la tête en vue dorsale sans carène occipitale. Longueur du valvifère 2 et de la valvule 3 combinés (fourreau complet de l'ovipositeur) égale ou inférieure à celle de l'aile antérieure. Métatibia garni de deux éperons apicaux .... ***Urocerus* Geoffroy** (p. 208)

Subfamily Siricinae

Diagnosis. Adults of Siricinae are distinguished from those of the Tremicinae by the thread-like flagellum.

Diversity. Three of seven world genera occur in North America, including Canada (Smith 1978).

Host. Larvae of all species feed and bore in coniferous trees (Smith 1978).

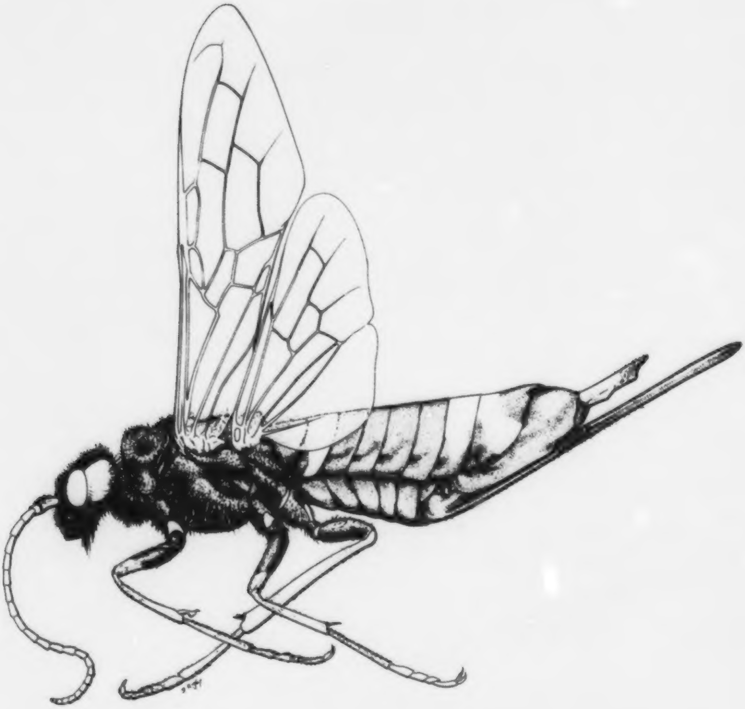
Genus *Sirex* Linnaeus

Diagnosis. Adults of *Sirex* are distinguished from other North American genera by the black head capsule and by the short and triangular horn-like extension of tergum 9 in females.

Diversity. The genus consists of 16 species (Smith 1978). Six or potentially eight of nine North American species are found in Canada. Most species are found in temperate forested regions across Canada (Smith 1979*a*).

Host. Larvae have been reported in the following coniferous genera of trees: bald cypress, fir, spruce, Douglas-fir, hemlock, pine, larch, juniper, *Libocedrus*, cypress, sequoia, and cedar (Smith 1979*a*). Larvae of each species of *Sirex* attack a wide range of trees (Smith 1979*a*).

Comments. The genus needs study. However, Cameron (1967) and Middlekauff (1960) have published local reviews of the genus. Kirk (1974) discussed the biology of southeastern species.



Siricidae: *Urocerus*

Genus *Urocerus* Geoffroy

Diagnosis. Adults of *Urocerus* are distinguished from those of other North American genera of the tribe by the white spot behind the eyes in dorsal view, by the elongate horn-like extension of tergum 9 in females, and by the absence of an occipital ridge on the posterior margin of the head.

Diversity. Most species are found in eastern Asia (Smith 1978). Six out of 22 world species are recorded in North America (Smith 1978, 1987). Four species are recorded in Canada, but five are expected. Three of the four species are widespread in forested regions of Canada, but *U. cressoni* Norton is restricted to eastern Canada (Smith 1979*a*).

Host. Like larvae of *Sirex*, those of this genus are markedly polyphagous and attack a wide range of genera of coniferous trees (Smith 1979*a*).

Comments. The North American species of the genus were keyed out by Smith (1987). Middlekauff (1960) reviewed the West Coast species.

Genus *Xeris* Costa

Diagnosis. Adults of *Xeris* are distinguished from those of other North American genera of the tribe by the presence of a white spot behind the eyes in dorsal view and by an occipital ridge on the posterior margin of the head. Females, which have an extremely long ovipositor, are unique among North American siricids.

Diversity. Of four species known in the world, three are North American (Smith 1978). Two species are recorded in Canada, but a third one is expected. The genus is restricted to Eurasia and North America (Smith 1978). Three species are found west of the Rocky Mountains (Smith 1979*a*).

Host. Larvae of each species are polyphagous, attacking many species of fir (Smith 1979*a*).

Comments. Adults are unusual in that mating occurs on hilltops (personal observation). Middlekauff (1960) reviewed the Californian species. Maa (1949) keyed the North American species and subspecies.

Subfamily Tremecinae

Diagnosis. Adults of Tremecinae are distinguished from those of Siricinae by the slightly swollen flagellum.

Diversity. Two out of four genera in the world are recorded in North America (Smith 1978). In Canada, only one genus is known. In addition, members of this subfamily are reported in Africa, Eurasia, and Cuba (Smith 1978).

Host. Larvae attack angiospermous trees (other than conifers) (Smith 1978).

Genus *Tremex* Jurine

Diagnosis. Adults of *Tremex* are distinguished from other Canadian genera of the family by the short antennae and by the reddish brown head and thorax.

Diversity. The genus is diverse in Eurasia, with 21 species, and is represented in North America and in Canada by a single species, *T. columba* (Linnaeus) (Smith 1978). This species is widespread in temperate forested regions of North America (Smith 1979*a*).

Host. Larvae feed in the trunks of maple, elm, oak, hickory, beech, and probably other deciduous trees (Smith 1979*a*).

Comments. The single North American species is characterized in Ross (1937). Stillwell (1967) discussed the biology of *T. columba*.

Superfamily Xiphydrioidea

FAMILY XIPHYDRIIDAE

Diagnosis. Adults of Xiphydriidae are easily distinguished from those other Symphyta by the unusually long propleura, or "neck," which clearly separate the head from the thorax, and by the usually shiny dome-shaped head.

Diversity. The family consists of two subfamilies, three tribes, 22 genera, and 95 species (Smith 1978). It is represented in Eurasia, Australia, New Zealand, and temperate South and North America (Smith 1978).

Host. Larvae are wood borers that attack mainly small dying branches (Smith 1978).

Comments. This family, previously assigned to Siricoidea, is not assigned to any superfamily because it is part of a lineage that is very likely a group related to Orussoidea.

Subfamily Xiphydriinae

Diagnosis. Adults of Xiphydriinae are easily distinguished by the deeply concave hind margin of the pronotum, which is several times deeper than the medial length of the pronotum (the medial length is about as long as that of the tegula).

Diversity. The subfamily consists of 18 genera in the world, but only *Xiphydria* is reported in North America, including Canada (Benson 1954; Smith 1978). The greatest diversity occurs in southeast Asia, though some genera are known in New Zealand, Australia, and temperate Eurasia (Smith 1978).

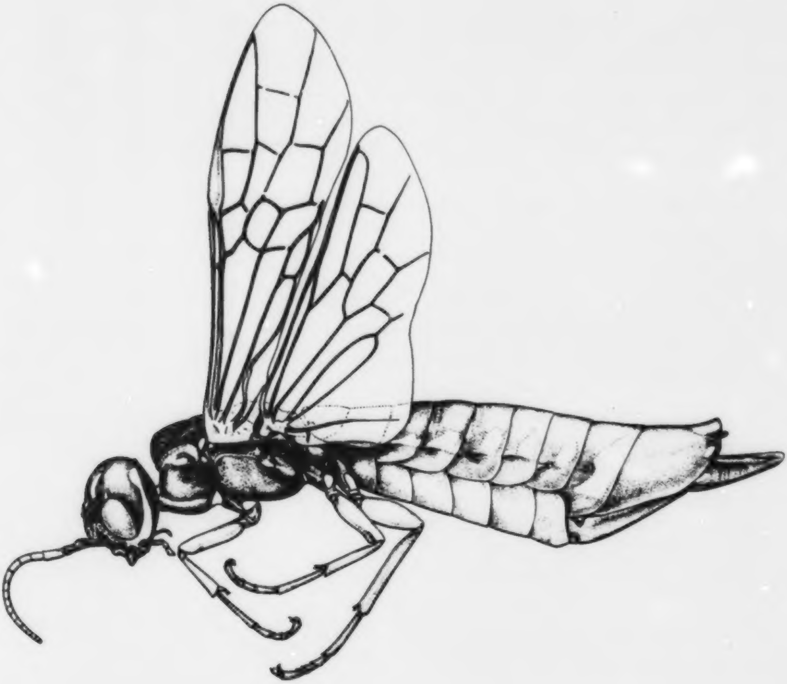
Genus *Xiphydria* Latreille

Diagnosis. See Xiphydriinae.

Diversity. *Xiphydria* consists of 25 species found in Eurasia and North America (Smith 1978). In North America 10 species are recorded (Smith 1976, 1983). In Canada five species are known, but 10 are expected. Except for one species, *X. mellipes* Harris, all others are found east of the prairie region (Smith 1979*a*).

Host. Larvae feed in branches of basswood, elm, hickory, birch, hophornbeam, ash, oak, beech, hawthorn, sumac, plum, and cherry. There are questionable records of one species on spruce, fir, and pine (Smith 1979).

Comments. Smith (1976) revised the North American species of the genus and characterized (1983) an additional species recently introduced. Deyrup (1984) presented an excellent study of the life history of a few species.



Xiphydriidae: ***Xiphydria***

Superfamily Orussoidea

Diagnosis. Adults of Orussoidea are readily distinguished from those of other Symphyta by the antennae, which are below the lowest margin of the eyes under a marked transverse ridge.

Diversity. The superfamily consists of one family.

FAMILY ORUSSIDAE

Diagnosis. See Orussoidea.

Diversity. Orussidae consists of two subfamilies, six tribes, 17 genera, and over 75 species (Benson 1955, Guiglia 1965, Middlekauff 1983). The greatest diversity in genera and species is in Africa, with 16 species, but in each continent 8–11 species occur (Benson 1955). In North America the family is represented by two subfamilies, four genera, and nine species (Middlekauff 1984). In Canada only one genus occurs, *Orussus*.

Host. Larvae are external parasites of wood-boring insects such as buprestid beetles (Middlekauff 1984).

Subfamily Orussinae

Diagnosis. Adults of Orussinae are distinguished from those of the other subfamily by vein 2r of the fore wing, which originates in the middle of the stigma, and (in males) by the absence of tubercles on the last tergum.

Diversity. The subfamily consist of four tribes (Benson 1955). In North America only Orussini is recorded (Middlekauff 1984).

Tribe Orussini

Diagnosis. Members of Orussini are distinguished from other tribes of the subfamily by vein M of the fore wing, which does not reach vein R and is clearly longer than vein 1m-cu; by the length of the flagellomere 1, which is about as long as the combined length of 3 and 4; and by the lack of lengthwise ridges between the eyes.

Diversity. The tribe consists of only two genera (Benson 1955), one of which, *Orussus*, is known in Canada and the United States (Middlekauff 1984). The greatest diversity is in Eurasia (Benson 1955).

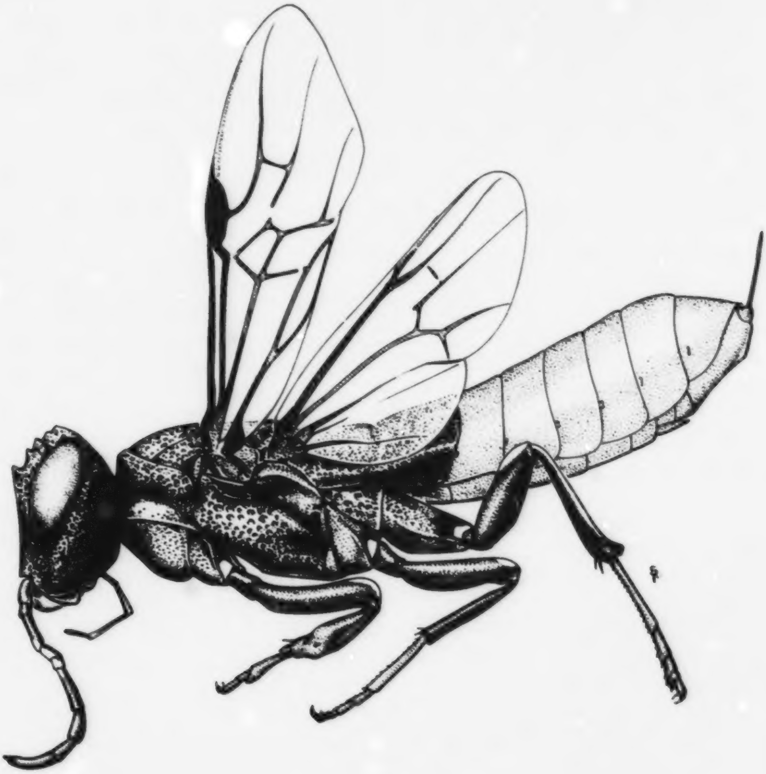
Genus *Orussus* Latreille

Diagnosis. Adults of *Orussus* are distinguished from those of the other genus by the sharp apex of the mesoscutellum.

Diversity. Of the 20 species described (Benson 1955), five are recorded in North America (Middlekauff 1984). In Canada four species are known. Three species are reported in temperate regions east of the Rocky Mountains (Middlekauff 1984).

Host. Larvae are external parasites of *Buprestis* and *Polycista* (buprestid beetles) (Middlekauff 1984).

Comments. Middlekauff (1984) revised the North American species of the genus.



Orussidae: *Orussus*

GLOSSARY

abdomen (adj., **abdominal**) The last part of the insect's body behind the thorax (Figs. 2*a*, 2*b*). In sawflies the abdomen is divided into 11 segments, but segments 9 and 10 are fused. Each segment consists of a dorsal tergum and ventral sternum.

acute The angle between two structures smaller than 90°.

anepimeron (pl., **anepimera**) The dorsal portion of the epimeron. In sawflies the mesepimeron is generally clearly divided into a dorsal and ventral (katepimeron) portion (Fig. 2*a*, anepimeron).

antenna (pl., **antennae**; adj., **antennal**) The appendage of the head above the clypeus and, in most sawflies, between the compound eyes (Fig. 3). The antennae are paired appendages, and each consists of a basal scape, followed by a pedicel and a flagellum, the last usually many-jointed (Fig. 4).

anterior Toward the head end of the body or structure.

apical Toward the end; farthest away from the body.

basal Toward the body; if in doubt, use anterior or posterior.

bicolor Pertaining to a surface of two colors.

cell The space between veins of the wing (Figs. 9*a*, 9*b*). A cell is closed when completely surrounded by veins (Fig. 9*a*, cell R); otherwise it is open (Fig. 9*a*, cell 3M). Cells are coded in capital letters.

cenchrus (pl., **cenchri**) A thinly sclerotized circular to oval structure between midline and side of the metascutum (Fig. 1, cenchrus).

cercus (pl., **cerci**) An appendage (one-segmented in adult sawflies). Posterolateral to tergum 10 (apparent tergum 9, which is a fusion of 9 and 10) (Fig. 1, cercus). Cerci are paired appendages.

claws A pair of sharp structures at the apex of tarsomere 5 in sawflies (Fig. 5, claw).

clypeus (adj., **clypeal**) A sclerite on the anterior margin of the head between the head capsule and the labrum (Fig. 3, clypeus).

concave Pertaining to a linear structure, margin, or surface that is curved inward; the opposite of convex.

concolor Pertaining to a surface of one color.

convergent Pertaining to linear structures or margins directed toward a point; the opposite of divergent.

convex Pertaining to a linear structure, margin, or surface that is curved outward; the opposite of concave.

coxa (pl., **coxae**; adj., **coxal**) The first cylinder-like sclerite at the base of a leg (Fig. 5, coxa). Coxae are paired and are developed on each of the three thoracic segments; hence procoxa, mesocoxa, and metacoxa (Fig. 2*a*).

crossvein The vein that is roughly at right angles with the base of the wing (Figs. 8*a*, 8*b*, 3r-m). Crossveins are abbreviated by lowercase letters.

disc (adj., **discal**) Pertaining to the central portion of a sclerite. Synonym: centre.

dorsal Toward the top or upper surface of the body or structure.

epicnemium (pl., **epicnemia**; adj., **epicnemial**) The anterior area of the mesepisternum delimited by a furrow from the remainder of the mesepisternum and referred to as the epicnemial area; the prepectus of many authors (Figs. 256, 257). In the absence of a furrow, when the epicnemial area is not outlined, this area is referred to as the mesepisternum in this work.

epimeron (pl., **epimera**; adj., **epimeral**) The posterior part of a thoracic pleural sclerite separated from the anterior part (the episternum) by the pleural suture (Fig. 2*a*, mesepimeron, metepimeron). The epimeron is clearly outlined in sawflies on the mesothorax and metathorax.

episternum (pl., **episterna**; adj., **episternal**) The anterior part of a thoracic pleural sclerite separated from the posterior part (the epimeron) by the pleural suture (Fig. 2*a*, mesepisternum, metepisternum). The episternum is clearly outlined in sawflies on the mesothorax and metathorax.

femur (pl., **femora**; adj., **femoral**) The third cylinder-like segment of the leg between the trochanter and the tibia (Fig. 5, femur). The segment is usually long and wide in sawflies. The base of the femur forms a trochanter-like structure. In many hymenopterous works this basal portion of the femur is referred to, together with the trochanter, as the double trochanter. Femora are paired and are developed on each of the three thoracic segments: hence, profemur, mesofemur, and metafemur.

flagellomere A subdivision of the flagellum (Fig. 4, flagellomeres 1–7). Flagellomeres are numbered consecutively from the base of the flagellum.

flagellum (pl., **flagella**; adj., **flagellar**) (Fig. 4, flagellomeres 1–7). The third and last major division of the antenna (the third joint of the antenna follows the scape and pedicel). The flagellum consists of one or more subdivisions or flagellomeres.

frontal Pertains to the region that includes ocelli, clypeus, and labrum.

furrow A linearly depressed area of a sclerite, which may be a thickening of the cuticle internally rather than the fusion of two sclerites (see suture). Synonym: groove.

harpes A lateral appendage at the apex of the male copulatory organ. Most of the outer surface of the harpes is visible externally (Fig. 2*b*, harpes). Harpes are paired appendages.

katepimeron (pl., **katepimera**) The ventral portion of the epimeron (Fig. 2*a*, katepimeron on mesopleuron). In sawflies the mesepimeron is generally divided into a dorsal (anepimeron) and ventral katepimeron.

labium (adj., **labial**) A mouthpart appendage fused at the midline and behind to the maxillae. It consists of a prementum, a postmentum, one pair of palps, and of one pair of fused glossae.

labrum (adj., **labral**) A sclerite on the dorsal or anterior surface of the head between the clypeus and the mandibles (Fig. 3, labrum).

lateral Toward the side of the body or the edge of margin of a structure.

lobes Paired sclerites of the scutum (Fig. 1, median lobe, lateral lobe). The lobes are clearly outlined on the mesoscutum of most sawflies. The mesoscutum consists of a pair of median and lateral lobes; the metascutum consists of a pair of lateral lobes. The median lobes are apparently fused.

malar space The thickly sclerotized surface between the compound eye and the mandible (Fig. 182*a*). In this work, I refer to the minimum distance compared with the diameter of the antennal socket.

mandible (adj., **mandibular**) A mouthpart appendage found between the labrum and the maxillae (Figs. 2*a*, 3, mandible). Mandibles are paired appendages. In sawflies the mandibles are very thickly sclerotized and are usually used as a cutting device.

margin (adj., **marginal**) Pertaining to any edge of a structure.

maxilla (pl., **maxillae**; adj., **maxillary**) A mouthpart appendage between the mandible and the labium. Maxillae are paired appendages. The maxilla consists of the cardo, stipes, palp, and lacinia.

medial Towards the centre or toward the central area or line of the body or structure.

membrane (adj., **membranous**) The thinly sclerotized surface of the insect body. In live or freshly killed specimens the surface is white; in dry specimens it is usually yellowish brown. The surface is generally covered with cone-like microsculpture.

meso- A prefix associated with each sclerite of the middle thoracic segment; hence the mesothorax.

mesoscutellar appendage The mesoscutellar appendage (the posttergite of some authors) is a sclerite attached by a suture or fused to the mesoscutellum and is found in most sawflies (Fig. 1, mesoscutellar appendage).

meta- A prefix associated with each sclerite of the last thoracic segment; hence the metathorax.

notaulus (pl., **notauli**) A furrow on the mesoscutum (Fig. 30, notaulus). In sawflies the notaulus divides the median from the lateral lobes.

notum (pl., **nota**; adj., **notal**) The dorsal part of the thorax above the pleural region (Fig. 2*a*, pronotum). Each thoracic segment has a notum; hence pronotum, mesonotum, and metanotum. The mesonota and metanota are divided into scutum, scutellum, and postnotum, but the pronotum is not divided. The postnotum refers to a sclerite behind the scutellum. The postnotum is clearly outlined on the mesonotum and metanotum.

oblique A linear structure or margin meeting another structure at an angle other than 90°; hence, not perpendicular.

obtuse An angle between two structures that is greater than 90°.

occipital ridge A ridge near the posterior margin of the mandible and when fully developed, extending to the top of the head, behind ocelli.

occipital view Includes the occiput, labium, and maxilla (in Symphyta it is a posterior view, a region termed the occiput).

occiput (adj., **occipital**) A portion of the head capsule that is posterior to the occipital ridge (Fig. 1, occiput). When the ridge is absent, it is the area posterior to an imaginary line extended from the posterior articulation of the mandible to and behind the postocellar area.

ocellus (pl., **ocelli**; adj., **ocellar**) A single eye on the dorsal surface of the head near the dorsal margin of the compound eyes (Fig. 1, ocellus). Sawflies have three ocelli: a median and two laterals.

ocular Pertaining to the compound eye.

ovipositor sheath The combination of valvifers 1 and 2 and valvula 3 (Fig. 2*a*).

palp A jointed appendage of the maxilla or the labium (Fig. 3, Mp, Lp). Palps are paired appendages. Joints are called palpomeres.

palpomere A joint of a palp (Fig. 3). The joints are numbered consecutively from the base of the palp. Palpomeres are qualified as maxillary if they are from the maxilla or labial if they are from the labium.

pedicel The second major division of the antenna found between the scape and the flagellum (Fig. 4, pedicel). The pedicel is not subdivided.

penis valve An appendage near the middle, at the apex of the male copulatory organ. The posterior part of penis valves are often visible between the harpes. Penis valves are paired appendages.

pit A concave structure on a sclerite often associated with a seta. In sawflies pits are usually round and may be large to very small. Pits are multicellular structures that consist of nonsensory microsculpture cells, usually not outlined at the surface. They also usually consist of a sensory mechanoreceptor, often a seta. Synonym: puncture.

pleuron (pl., **pleura**; adj., **pleural**) The lateral surface of the thorax between the sternum and the notum (Fig. 2*a*, propleuron, mesopleuron, metapleuron). On the mesothorax and the metathorax, the pleuron is divided into an episternum and an epimeron, but it is not clearly subdivided on the prothorax. Each thoracic segment has a pleuron in sawflies; hence, propleuron, mesopleuron, and metapleuron.

posterior Toward the hind end of the body or structure.

postocellus (adj., **postocellar**) The area of the head between the lateral ocelli and the occipital ridge (or its imaginary position) (Fig. 3, postocellar area).

postocular area The part of the head between the occiput (the back portion of the head often delimited by a ridge extending from the mandible to the lateral ocellar furrow) and the posterior margin of the eye up to the lateral ocellar furrow (Fig. 1, postocular area). Synonyms: cheek, gena.

pro- A prefix associated with each sclerite of the first thoracic segment; hence, the prothorax.

pubescence (adj., **pubescent**) The fur-like aspect of a surface on the insect body.

pulvillus (pl., **pulvilli**; adj., **pulvillar**) A ventroapical outgrowth of tarsomeres 1–4 in most sawflies (Fig. 5, pulvillus). In sawflies the pulvilli are membranous.

ridge The linearly raised or protruding area of a sclerite. Synonym: carina.

scape The first major division of the antenna (Fig. 4, scape). The scape is the first joint of the antenna and is not subdivided in sawflies.

sclerite (adj., **sclerotized**) A hard surface on the insect body. Thickly sclerotized surfaces are usually pigmented, but thinly sclerotized or membranous surfaces are white with a cone-like microsculpture over most of the surface.

sculpture Pertaining to a mesh-like development over a sclerite. The space between meshes consists usually of one cell and affects the brightness of the surface. The meshes are visible in sawflies under diffused light at a magnification of 40×. When a surface is not sculptured it is smooth and bright.

scutellum (pl., **scutella**; adj., **scutellar**) The middle section of a notum behind the scutum and in front of the postnotum (Fig. 1, mesoscutellum, metascutellum). In sawflies the scutellum is clearly outlined on the mesonotum and metanotum; hence, mesoscutellum and metascutellum.

scutum (pl., **scuta**; **scutal**) The section of a notum in front of the scutellum (Figs. 1, 2*a*, mesoscutum). In sawflies the scutum is clearly outlined on the mesonotum and metanotum; hence, mesoscutum and metascutum. The metascutum supports the cenchri.

seta (pl., **setae**; adj., **setal**) A hair-like structure with a socket at the base. Setae are isolated or in group (see pubescence) and have sensory functions. They are an outgrowth from a cell at the base and do not consist of cells along the shaft; hence, they are not spurs.

spiracle (adj., **spiracular**) The external opening of the tracheae (part of the internal respiratory system) found in the membranous portion behind the pronotum and the mesepimeron and laterally on terga 1–8 (Fig. 2*a*, spiracle).

spur A large spike-like structure of the tibia found at the apex; in many sawflies also found along the ventral surface before the apex (Fig. 5, spur). Spurs are multicellular structures as shown in sawflies by the many seta-like cells on their surface. Spurs are not setae (see seta).

sternum (pl., **sterna**; adj., **sternal**) The ventral surface of the thorax and the abdomen (Fig. 1). In sawflies the sterna are clearly outlined on the prothorax (prosternum) and on abdominal segments 2–7 in females or 2–9 in males. However, the sterna are not clearly delimited or understood on the mesothorax and the metathorax, where they consist of at least a small fork in the middle of the posterior margin.

stigma A portion of the fore wing that is thickly sclerotized (usually darkly pigmented) just beyond the apex of the vein C (Figs. 6*a*, 7*a*, stigma). The inner portion of the stigma consists of the vein R_1, which is distinguishable in some specimens. The hind wing has no stigma, though the outline of one is clear near the junction of veins C and R_1 (Figs. 6*b*, 7*b*, C, R_1).

sub- A prefix associated with terms such as equal, lateral, basal, anterior and meaning almost or near, but not at.

suture (adj., **sutural**) A furrow-like or membranous junction between two sclerites, which results from the union of previously isolated sclerites. Example: the furrow between terga 9 and 10 of the female.

tarsomere A joint of a tarsus (Fig. 5). Tarsomeres are paired and occur on each thoracic segment; hence, protarsomere, mesotarsomere, and metatarsomere. Tarsomeres of a leg are numbered consecutively, starting with the joint nearest the tibia.

tarsus (pl., **tarsi**; adj., **tarsal**) The last segment of the leg found after the tibia. In sawflies the tarsus is five-jointed. Tarsi are paired and occur on each thoracic segment; hence, protarsus, mesotarsus, and metatarsus. Joints are called tarsomeres.

tegula (pl., **tegulae**) (Figs. 1, 2*a*, tegula) A small and scale-like sclerite at the base of the fore wing. The tegula is attached to the thorax along the anterior margin.

tentorial pit A depression near the clypeofrontal groove found below the antennal socket in sawflies (Fig. 3, tentorial pit).

tergum (pl., **terga**; adj., **tergal**) A sclerite on the dorsal surface of each abdominal segment (Figs. 1, 2). The abdomen consists of 10 terga. In males, tergum 9 is divided and restricted laterally and tergum 10 is narrow; both are usually hidden. In females terga 9 and 10 are fused but still outlined.

thorax (pl., **thoraces**; adj., **thoracic**) The second major division of the insect body (Figs. 1, 2*a*). The thorax includes legs and wings (when developed) and is subdivided into three segments: prothorax, mesothorax, and metathorax.

tibia (pl., **tibiae**; adj., **tibial**) The fourth cylinder-like segment of the leg between the femur and the tarsus (Fig. 5, tibia). In sawflies the tibia is usually long and narrow. Tibiae are paired segments found on each thoracic segment; hence, protibia, mesotibia, and metatibia.

transscutal articulation A transverse groove anterior to the mesoscutellum (Fig. 37). This articulation is found on adults of Xiphydriidae and Orussidae.

transverse Pertaining to a structure that is clearly wider than long in relation to the body midline.

trochanter (adj., **trochanteral**) The second cylinder-like segment of the leg between the coxa and the femur (Fig. 5, trochanter). In sawflies trochanters are short and not subdivided (see femur for information on double trochanter).

valvifer The first segment of the ovipositor. Sawflies have two valvifers (Fig. 2*a*, valvifer 1, valvifer 2), both of which are visible externally and form part of a sheath-like structure (the sheath of most authors). Valvula 1 is attached to valvifer 1, and valvulae 2 and 3 to valvifer 2.

valvula (pl., **valvulae**) The second segment of the ovipositor (Fig. 2*a*, valvula 3). There are three valvulae. In sawflies valvulae 1 and 2 (respectively, lance and lancet of Ross 1945*b*) form a saw-like structure and are usually hidden by the valvula 3.

vein A tube-like structure of the wings. Veins are usually thickly sclerotized and darkly pigmented. They extend from the base and may branch, join another vein or veins, or fuse with another vein.

ventral Toward the bottom or lower surface of the body or structure.

REFERENCES

Atwood, C.E. 1961. Present status of the sawfly family Diprionidae (Hymenoptera) in Ontario. Proc. ent. Soc. Ont. 91:205–215.

Benes, K. 1972. Generic classification of the tribe Pamphiliini (Hymenoptera, Pamphiliidae). Sb. ent. Odd. nár. Mus. Praze 69:378–395.

Benson, R.B. 1938. On the classification of sawflies (Hymenoptera Symphyta). Trans. R. ent. Soc. Lond. 87(15):353–384.

Benson, R.B. 1939. On the genera of the Diprionidae (Hymenoptera Symphyta). Bull. ent. Res. 30:339–342.

Benson, R.B. 1943. Studies in Siricidae, especially of Europe and Southern Asia (Hymenoptera, Symphyta). Bull. ent. Res. 34:27–51.

Benson, R.B. 1945*a*. Classification of the Xyelidae (Hymenoptera Symphyta). Proc. R. ent. Soc. Lond., Ser. B 14:34–37.

Benson, R.B. 1945*b*. Classification of the Pamphiliidae (Hymenoptera Symphyta). Proc. R. ent. Soc. Lond., Ser. B 14:25–33.

Benson, R.B. 1945*c*. Further notes on the classification of the Diprionidae (Hymenoptera Symphyta). Bull. ent. Res. 36:163–164.

Benson, R.B. 1946. Classification of Cephidae. (Hymenoptera: Symphyta). Trans. R. ent. Soc. Lond. 96(6):89–108.

Benson, R.B. 1950. An introduction to the natural history of British sawflies. Trans. Soc. Br. Ent. 10(2):46–142.

Benson, R.B. 1951. Hymenoptera Symphyta. Section (a). Handbook for the identification of British insects. R. ent. Soc. Lond. 6(2a):1–50.

Benson, R.B. 1952. Hymenoptera Symphyta. Section (b). Handbook for the identification of British insects. R. ent. Soc. Lond. 6(2b):51–138.

Benson, R.B. 1954. Classification of the Xiphydriidae (Hymenoptera). Trans. R. ent. Soc. Lond. 105(9):151–162.

Benson, R.B. 1955. Classification of the Orussidae, with new genera and species. Proc. R. ent. Soc. Lond., Ser. B 24(1–2):13–23.

Benson, R.B. 1958. Hymenoptera Symphyta. Section (c). Handbook for the identification of British insects. R. ent. Soc. Lond. 6(2c):139–252 + 6 pp.

Benson, R.B. 1959. Tribes of the Tenthredinidae and a new European genus (Hym.: Tenthredinidae). Proc. R. ent. Soc. Lond., Ser. B 28:121–127.

Benson, R.B. 1960. Studies in Pontania (Hym., Tenthredinidae). Bull. Br. Mus. nat. Hist. (Ent.) 8:369–384.

Benson, R.B. 1963. A new European sawfly related to *Pachynamatus rumicis* (L.) (Hymenoptera: Tenthredinidae). Proc. R. ent. Soc. Lond., Ser. B: Taxonomy 32:162–164.

Benson, R.B. 1965. The classification of *Rhogogaster* Konow (Hymenoptera: Tenthredinidae). Proc. R. ent. Soc. Lond., Ser. B 34 (9-10):105–112.

Bradley, J.C. 1913. The Siricidae of North America. J. Ent. Zool. 5(1):1–35.

Burdick, D.J. 1961. A taxonomic and biological study of the genus *Xyela* Dalman in North America. Univ. Cal. Publs Ent. 17:285–356.

Cameron, E.A. 1967. Notes on *Sirex juvencus californicus* (Hymenoptera: Siricidae) with a description of the male and a key to California species of *Sirex*. Can. Ent. 99:18–24.

Champlain, A.B. 1924. *Adirus trimaculatus* Say. J. econ. Ent. 17:648.

Deyrup, M.A. 1984. A maple wood wasp, *Xiphydria maculata*, and its insect enemies (Hymenoptera: Xiphydriidae). Gt Lakes Entomologist 17(1):17–28.

Eidt, D.C. 1969. The life histories, distribution, and immature forms of the North American sawflies of the genus *Cephalcia* (Hymenoptera: Domphiliidae). Mem. ent. Soc. Can. 59:56 pp.

Gibson, G.A.P. 1980*a*. A revision of the genus *Macrophya* Dahlbom (Hymenoptera: Symphyta, Tenthredinidae) of North America. Mem. ent. Soc. Can. 114:1–167.

Gibson, G.A.P. 1980*b*. *Deda*, a new genus of sawflies from western North America (Hymenoptera: Symphyta, Tenthredinidae). Can. Ent. 112(3):249–258.

Goulet, H. 1981. Distinguishing external features of adult males and females of North American species of *Phymatocera* Dahlbom (Hymenoptera: Tenthredinidae) and their phylogeny. Can. Ent. 113:801–806.

Goulet, H. 1986. The genera and species of the Nearctic Dolerini (Symphyta: Tenthredinidae: Selandriinae): classification and phylogeny. Mem. ent. Soc. Can. 135:1–208.

Guiglia, D. 1965. Orussidae. Pages 1–18 *in* Ferrière, C.; van der Vecht, J., eds. Catalogus Hymenopterorum 1.

Hanson, P.E.; Miller, J.C. 1988. Notes on the biology of *Caenocephus aldrichi* Bradley (Hymenoptera: Cephidae). Proc. ent. Soc. Wash. 90(2):204–206.

Kathryn, L.; Evans, H.J. 1989. Biological notes on a birch leaf edgeminer *Scolioneura betuleti* (Hymenoptera: Tenthredinidae) new to North America. Proc. Ent. Soc. Ont. 120:17–24.

Kirk, A.A. 1974. Siricid woodwasps and their associated parasitoids in the southeastern United States (Hymenoptera: Siricidae). J. Ga ent. Soc. 9:139–140.

Maa, T. 1949. A synopsis of Asiatic Siricoidea with notes on certain exotic and fossil forms (Hymenoptera Symphyta). Notes d'Entomologie Chinoise 13(2):11–189.

Malaise, R. 1937. A new insect trap. Ent. Tidskr. 58:148–160.

Marlatt, C.L. 1888. Notes on a red cedar saw-fly. Trans. Kans. Acad. Sci. 10:80–82.

Martin, J.E.H. 1977. Collecting, preparing, and preserving insects, mites, and spiders. Part 1. The insects and arachnids of Canada. Agric. Can. Publ. 1643. 182 pp.

Masner, L.; Goulet, H. 1981. A new model of flight-intercept trap for some hymenopterous insects. Ent. News 92(5):199–202.

Middlekauff, W.W. 1952. Notes on two species of California stem borers. Pan-Pacif. Ent. 28:108.

Middlekauff, W.W. 1958. The North American sawflies of the genera *Acantholyda, Cephalcia* and *Neurotoma*. Univ. Calif. Publs Ent. 14(2):51–174.

Middlekauff, W.W. 1960. The siricid wood wasps of California. Bull. Calif. Insect Surv. 6(4):59–77.

Middlekauff, W.W. 1964. The North American sawflies of the genus *Pamphilius* (Hymenoptera: Pamphiliidae). Univ. Calif. Publs Ent. 38:1–84.

Middlekauff, W.W. 1969. The cephid stem borers of California (Hymenoptera: Cephidae). Bull. Calif. Insect Surv. 11:5–6.

Middlekauff, W.W. 1974. Larva of wood-boring sawfly *Syntexis libocedrii* Rohwer (Hymenoptera: Syntexidae). Pan-Pacif. Ent. 50(3):288–290.

Middlekauff, W.W. 1984. A revision of the sawfly family Orussidae for North and Central America (Hymenoptera: Symphyta, Orussidae). Univ. Calif. Publs Ent. 101:1–46.

Middlekauff, W.W. 1988. A new species of *Neurotoma* from Michigan (Hymenoptera: Symphyta, Pamphiliidae). Pan-Pacif. Ent. 64(3):270–274.

Morris, R.F. 1967. Distribution and host of some horntails (Siricidae) in British Columbia. J. ent. Soc. B.C. 64:60–63.

Nauman, I.D. 1984. An apterous female sawfly (Hymenoptera: Symphyta) from Papua, New Guinea. Syst. Ent. 9:339–349.

Neilson, W.T.A. 1958. Notes on life-histories of sawflies (Hymenoptera: Tenthredinidae) common in low-bush blueberry fields in New Brunswick. Can. Ent. 90:229–234.

Price, P.W. 1970. A loosestrife sawfly, *Monostegia abdominalis* (Hymenoptera: Tenthredinidae). Can. Ent. 102:491–495.

Price, P.W. 1975. Insect ecology. John Wiley & Sons, Toronto, Ont. x + 514 pp.

Rasnitsyn, A.P. 1969. Origin and evolution of the lower Hymenoptera. Trudy paleont. Inst. 123:1–196.

Rasnitsyn, A.P. 1980. The origin and evolution of Hymenoptera (in Russian). Trudy paleont. Inst. 174:1–192.

Rasnitsyn, A.P. 1988. An outline of the evolution of the Hymenopterous insects (order Vespida). Orient. Insects 22:115–145.

Ries, D.T. 1937. A revision of the Nearctic Cephidae (Hymenoptera, Symphyta). Trans. Am. ent. Soc. 63:259–324.

Ross, H.H. 1929. A study of Marlatt's group I of the genus *Pontania* with descriptions of four new species. Proc. ent. Soc. Wash. 31:91–97.

Ross, H.H. 1932. The Hymenopterous family Xyelidae in North America. Ann. ent. Soc. Am. 25:153–169.

Ross, H.H. 1935. The Nearctic sawflies of the *Dineura* complex (Hymen.: Tenthredinidae). Can. Ent. 67:201–205.

Ross, H.H. 1937. A generic classification of the Nearctic sawflies (Hymenoptera Symphyta). Illinois biol. Monogr. 15(2):1–173.

Ross, H.H. 1938. The Nearctic species of *Pikonema*, a genus of spruce sawflies (Hymenoptera, Tenthredinidae). Proc. ent. Soc. Wash. 40(1):17–20.

Ross, H.H. 1943*a*. The Nearctic sawflies of the genus *Aglaostigma* (Hymenoptera). Proc. ent. Soc. Wash. 45(4):79–84.

Ross, H.H. 1943*b*. North American sawflies of the genus *Hoplocampa* (Hymenoptera: Tenthredinidae). Trans. Am. ent. Soc. 69:61–92.

Ross, H.H. 1943*c*. The Nearctic species of the genus *Rhogogaster* (Hymenoptera). Pan-Pacif. Ent. 19(4):129–133.

Ross, H.H. 1945*a*. A taxonomic outline of the Nearctic species of *Pachynematus* (Tenthredinidae, Hymenoptera). Proc. ent. Soc. Wash. 47(5):105–120.

Ross, H.H. 1945*b*. Sawfly genitalia: terminology and study techniques. Ent. News 56:261–268.

Ross, H.H. 1955. The taxonomy and evolution of the sawfly genus *Neodiprion*. Forest Sci. Monogr. 1(3):196–209.

Shinohara, A.; Smith, D.R. 1983. *Pamphilius middlekauffi* Shinohara and Smith, new species, for "*Pamphilius ocreatus*" of authors (Hymenoptera: Pamphiliidae). Proc. ent. Soc. Wash. 85(4):858–859.

Smith, D.R. 1964. Description of the male of *Xyelecia nearctica* with comments on the genus (Hymenoptera: Xyelidae). Pan-Pacif. Ent. 40(1):54–56.

Smith, D.R. 1967. A review of the larvae of Xyelidae, with notes on the family classification (Hymenoptera). Ann. ent. Soc. Am. 60(2):382–383.

Smith, D.R. 1968. The genus *Caulocampus* Rohwer (Hymenoptera: Tenthredinidae). Proc. ent. Soc. Wash. 70(2):126–129.

Smith, D.R. 1969*a*. Nearctic sawflies. II. Selandriinae: Adults (Hymenoptera: Tenthredinidae). U.S. Dep. Agric. Tech. Bull. 1398:10 + 48 pp.

Smith, D.R. 1969*b*. The genus *Susana* Rohwer and Middleton (Hymenoptera: Tenthredinidae). Proc. ent. Soc. Wash. 71(1):13–23.

Smith, D.R. 1969*c*. Nearctic sawflies. I. Blennocampinae: adults and larvae (Hymenoptera: Tenthredinidae). U.S. Dep. Agric. Tech. Bull. 1397. 19 + 179 pp.

Smith, D.R. 1969*d*. Key to genera of Nearctic Argidae (Hymenoptera) with revisions of the genera *Atomacera* Say and *Sterictiphora* Billberg. Trans. Am. ent. Soc. 95:439–457.

Smith, D.R. 1969*e*. The genus *Craterocercus* Rohwer (Hymenoptera: Tenthredinidae). Proc. ent. Soc. Wash. 71(2):153–161.

Smith, D.R. 1971*a*. Neartic Sawflies. III. Heterarthrinae: adults and larvae (Hymenoptera: Tenthredinidae). U.S. Dep. Agric. Tech. Bull. 1420. 84 + 18 pp.

Smith, D.R. 1971*b*. Neartic sawflies of the genera *Neoptilia* Ashmead, *Schizocerella* Forsius, *Aprostema* Konow, and *Sphacophilus* Provancher (Hymenoptera: Argidae). Trans. Am. ent. Soc. 97:537–594.

Smith, D.R. 1972. Sawflies of the genus *Croesus* Leach in North America (Hymenoptera: Tenthredinidae). Proc. ent. Soc. Wash. 74(2):169–180.

Smith, D.R. 1973. The sawfly tribe Lyacotini in South America (Hymenoptera: Tenthredinidae). Pan-Pacif. Ent. 49(2):93–101.

Smith, D.R. 1974*a*. Conifer sawflies, Diprionidae: key to North American genera, checklist of world species and new species from Mexico (Hymenoptera). Proc. ent. Soc. Wash. 76(4):409–418.

Smith, D.R. 1974*b*. *Ischyroceraea* Kiaer, a sawfly genus new for North America (Hymenoptera: Tenthredinidae). Co-op. econ. Insect Rep. 24(35):707–710.

Smith, D.R. 1974*c*. Sawflies of the tribe Cladiini in North America (Hymenoptera: Tenthredinidae: Nematinae). Trans. Am. ent. Soc. 100:1–28.

Smith, D.R. 1975*a*. The sawfly genus *Hemichroa* Stephens: a review of species (Hymenoptera: Tenthredinidae). Ent. Scand. 6:297–302.

Smith, D.R. 1975*b*. *Eriotremex formosanus* (Matsumura), an Asian horntail in North America (Hymenoptera: Siricidae). Co-op. econ. Insect Rep. 24(35):707–710.

Smith, D.R. 1976*a*. The xiphydriid woodwasps of North America (Hymenoptera: Xiphydriidae). Trans. Am. ent. Soc. 102:101–131.

Smith, D.R. 1976*b*. Sawflies of the Holarctic genus *Platycampus* Schiodte (Hymenoptera: Tenthredinidae). Proc. ent. Soc. Wash. 78(2):202–207.

Smith, D.R. 1976*c*. World genera of the leaf-mining sawfly tribe Fenusini (Hymenoptera: Tenthredinidae). Ent. Scand. 7:253–260.

Smith, D.R. 1976*d*. Sawflies of the tribe Pseudodineurini in North America (Hymenoptera: Tenthredinidae). Proc. ent. Soc. Wash. 78(1):67–79.

Smith, D.R. 1978. Suborder Symphyta (Xyelidae, Pararchexyelidae, Parapamphiliidae, Xyelydidae, Karatavitidae, Gigasiricidae, Sepulcidae, Pseudosiricidae, Anaxyelidae, Siricidae, Xiphydriidae, Paroryssidae, Xyelotomidae, Blasticotomidae, Pergidae). Hymenopterorum Catalogus 14:6 + 193 pp.

Smith, D.R. 1979*a*. Suborder Symphyta. Pages 3–137 *in* Krombein, K.V.; Hurd, P.D., Jr.; Smith, D.R.; Burks, B.D. Catalog of Hymenoptera in America North of Mexico. Smithsonian Institution Press, Washington, D.C.

Smith, D.R. 1979*b*. Nearctic sawflies. IV. Allantinae: adults and larvae (Hymenoptera: Tenthredinidae). U.S. Dep. Agric. Tech. Bull. 1595, 13 + 169 pp.

Smith, D.R. 1980. Notes on sawflies (Hymenoptera: Symphyta) with two new species and a key to North American *Dolerus*. Proc. ent. Soc. Wash. 82(3):482–487.

Smith, D.R. 1983. *Xiphydria prolongata* (Geoffroy) (Hymenoptera: Xiphydriidae) adventive to North America. Proc. ent. Soc. Wash. 85(4):860–861.

Smith, D.R. 1986*a*. Review of the sawfly genus *Lagium* (Hymenoptera: Tenthredinidae). Proc. ent. Soc. Wash. 88(1):179–184.

Smith, D.R. 1986*b*. The sawfly genus *Nematinus* in North America (Hymenoptera: Tenthredinidae). Proc. ent. Soc. Wash. 88(3):476–484.

Smith, D.R. 1986*c*. The berry and rose stem-borers of the genus *Hartigia* in North America (Hymenoptera: Cephidae). Trans. Am. ent. Soc. 112:129–145.

Smith, D.R. 1987. *Urocerus sah* (Mocsary) (Hymenoptera: Siricidae) New to North America and Key to North American Species of *Urocerus*. Proc. ent. Soc. Wash. 89(4):834–835.

Smith, D.R. 1988*a*. A synopsis of the sawflies (Hymenoptera: Symphyta) of America South of the United States: introduction, Xyelidae, Pamphiliidae, Cimbicidae, Diprionidae, Xiphydriidae, Siricidae, Orussidae, Cephidae. Syst. Ent. 13:205–261.

Smith, D.R. 1988*b*. A new species of the leafmining sawfly genus *Metallus* (Hymenoptera: Tenthredinidae) from eastern North America. Ent. News 94(4):181–183.

Smith, D.R. 1989. The sawfly genus *Arge* (Hymenoptera: Argidae) in the Western Hemisphere. Trans. Am. ent. Soc. 115:83–205.

Smith, D.R. 1990. A new *Xyela* (Hymenoptera: Xyelidae) from western United States. Ent. News 101(1):9–12.

Smith, D.R.; Gibson, G.A.P. 1984. *Filacus*, a new genus of four species of sawflies previously placed in *Macrophya* or *Zaschizonyx* (Hymenoptera: Tenthredinidae. Pan-Pacif. Ent. 60(2):101–113.

Smith, D.R.; McDearman, W. 1990. A new *Rhadinoceraea* (Hymenoptera: Tenthredinidae) feeding on *Zigadenus* (Liliaceae) from southeastern United States. Ent. News 101(1):13–19.

Smith, D.R.; Ohmart, C.P.; Dahlsten, D.L. 1977. The fir shoot-boring sawflies of the genus *Pleroneura* in North America (Hymenoptera: Xyelidae). Ann. ent. Soc. Am. 70(5):761–767.

Smith, D.R.; Solomon, J.D. 1989. A new *Janus* (Hymenoptera: Cephidae) from *Quercus* and key to North American species. Ent. News 100(1):1–5.

Smith, L. 1968. Biosystematics and morphology of Symphyta. I. Stem-galling *Euura* of the California region, and a new female genitalic nomenclature. Ann. ent. Soc. Am. 61:1389–1407.

Smulyan, M.T. 1923. New England sawflies of the genus *Tenthredella* Rohwer. Proc. Boston Soc. nat. Hist. 36(6): 383–465.

Snodgrass, R.E. 1935. The principles of insect morphology. McGraw-Hill, New York, N.Y. 667 pp.

Stannard, L.J. 1949. The Nearctic species of the genus *Periclista* (Hymenoptera: Tenthredinidae). Trans. Am. ent. Soc.75:7–42.

Stillwell, M.A. 1966. Woodwasps (Siricidae) in conifers and the associated fungus *Stereum chailettii*, in eastern Canada. Forest Sci. Monogr. 12:121–128.

Stillwell, M.A. 1967. The pidgeon Tremex, *Tremex columba* (Hymenoptera: Siricidae), in New Brunswick. Can. Ent. 99:686–689.

Strickland, E.H. 1954. A key to the females of *Tenthredo* of the Canadian prairies. (Hymenoptera: Tenthredinidae). Can. Ent. 86:278–281.

Taeger, A. 1987. Erganzungen zur Blattwespenfauna Bulgariens und Bearbeitung der Gattung *Monostegia* O. Costa (Insecta, Hymenoptera, Symphyta, Tenthredinidae). Faun. Abh. Mus. Tierkd. Dresden 15(1):1–10.

Townes, H.K. 1972. A light-weight Malaise trap. Proceedings Tall Timbers Conference on Ecology Animal Control by Habitat Management, No. 3, pp. 239–247.

Wallace, L.E.; McNeil, F.H. 1966. Stem sawflies of economic importance in grain crops in the United States. U.S. Dep. Agric. Tech. Bull. 1350. 50 pp.

Wescott, R.L. 1971. New host and distribution records for three western wood-boring Hymenoptera. Pan-Pacif. Ent. 47:310

Wolf, F. 1968. Éthologie des Siricidae (Hymenoptera Symphyta). Bull. Annls Soc. ent. Belg. 104:427–457.

Wolf, F. 1969. Sur les ennemies des hyménoptères siricides. Bull. Annls Soc. ent. Belg. 105:202–224.

Wong, H.R. 1955. Larvae of the Nearctic species of *Anoplonyx*. Can. Ent. 87:224–227.

Wong, H.R. 1963. The external morphology of the adult and ultimate larval instar of the larch sawfly, *Pristiphora erichsonii* (Htg.) (Hymenoptera: Tenthredinidae). Can. Ent. 95:897–921.

Wong, H.R. 1967. The nematines genera *Eitelius* and *Micronematus* in North America (Hymenoptera: Tenthredinidae). Can. Ent. 99:1101–1104.

Wong, H.R. 1968*a*. *Decanematus*, a sawfly genus new to North America (Hymenoptera: Tenthredinidae. Can. Ent. 100(1):84–86.

Wong, H.R. 1968*b*. A revision of the tribe Pristolini (Hymenoptera: Tethredinidae). Can. Ent. 100(10):1049–1057.

Wong, H.R. 1977. *Fallocampus*: a new sawfly genus for the Nearctic species of *Platycampus* Schiodte (Hymenoptera: Tenthredinidae). Can. Ent. 109:1103–1107.

Wong, H.R.; Benson, R.B. 1965. A new species of *Pristiphora* from Brazil (Tenthredinidae: Hymenoptera). Can. Ent. 97(7): 779–782.

Wong, H.R.; Milliron, H.E. 1972. A Canadian species of *Susana* on western juniper. Can. Ent. 104:1025–1028.

Zhelochovtsev, A.N. 1988. Suborder Symphyta (Chalastogastra). Pages 7–234 *in* Medvedev, G.S., ed. The key to insects of European USSR. Vol. 3. Hymenoptera, 6th part. Nauka, Leningrad, USSR.

Zinovjev, A.G. 1985. On the taxonomy of the sawfly genus *Pontania* O. Costa (Hymenoptera, Tenthredinidae) subgenus *Eupontania* subg. n. Trudy Zool. Inst., Leningr. 132:3–16.

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